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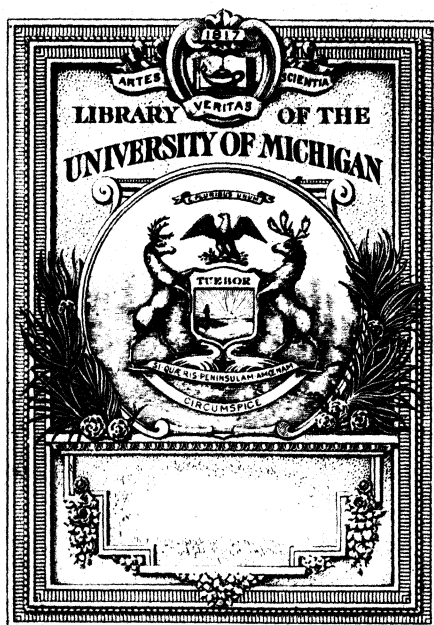
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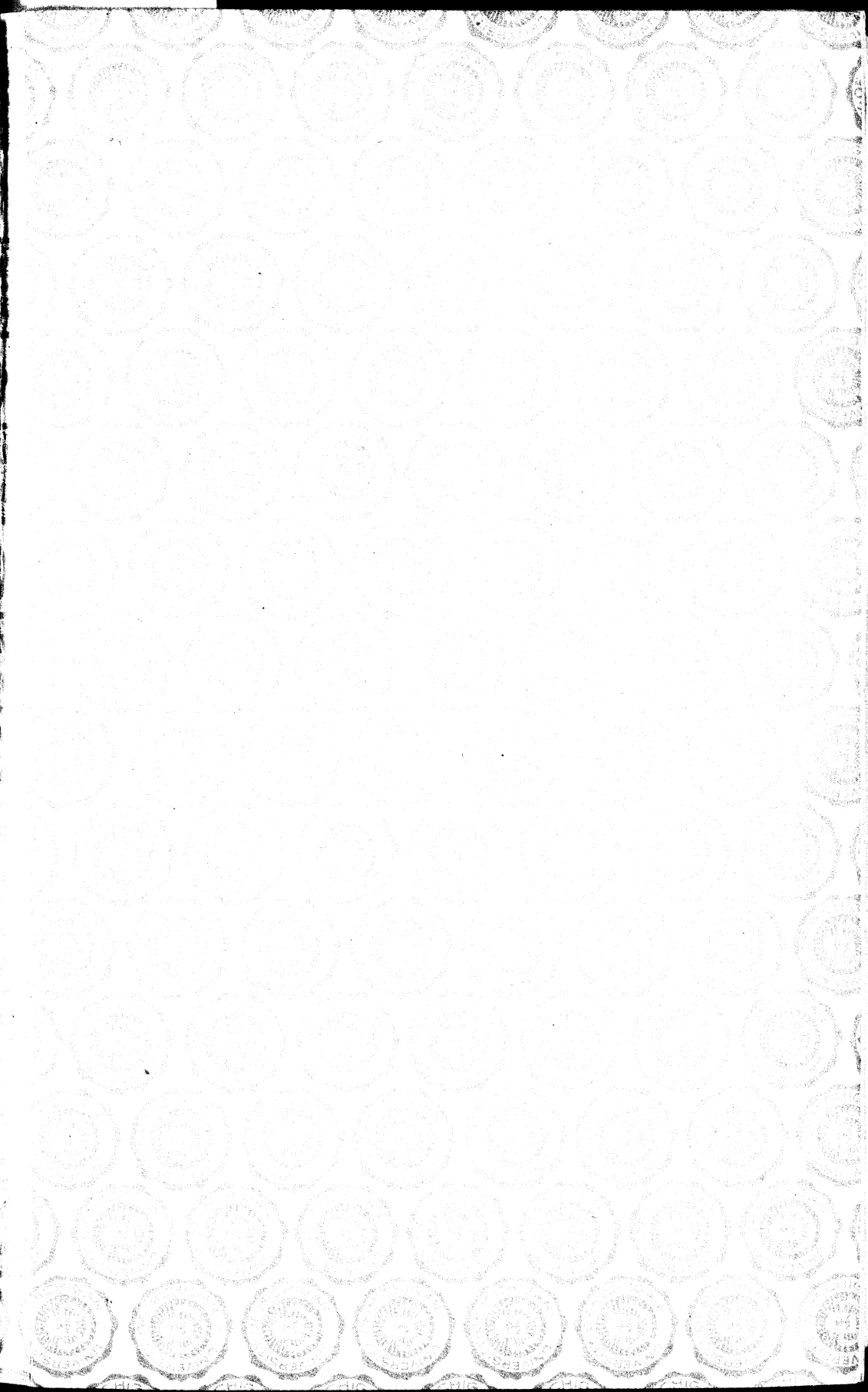
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OF  
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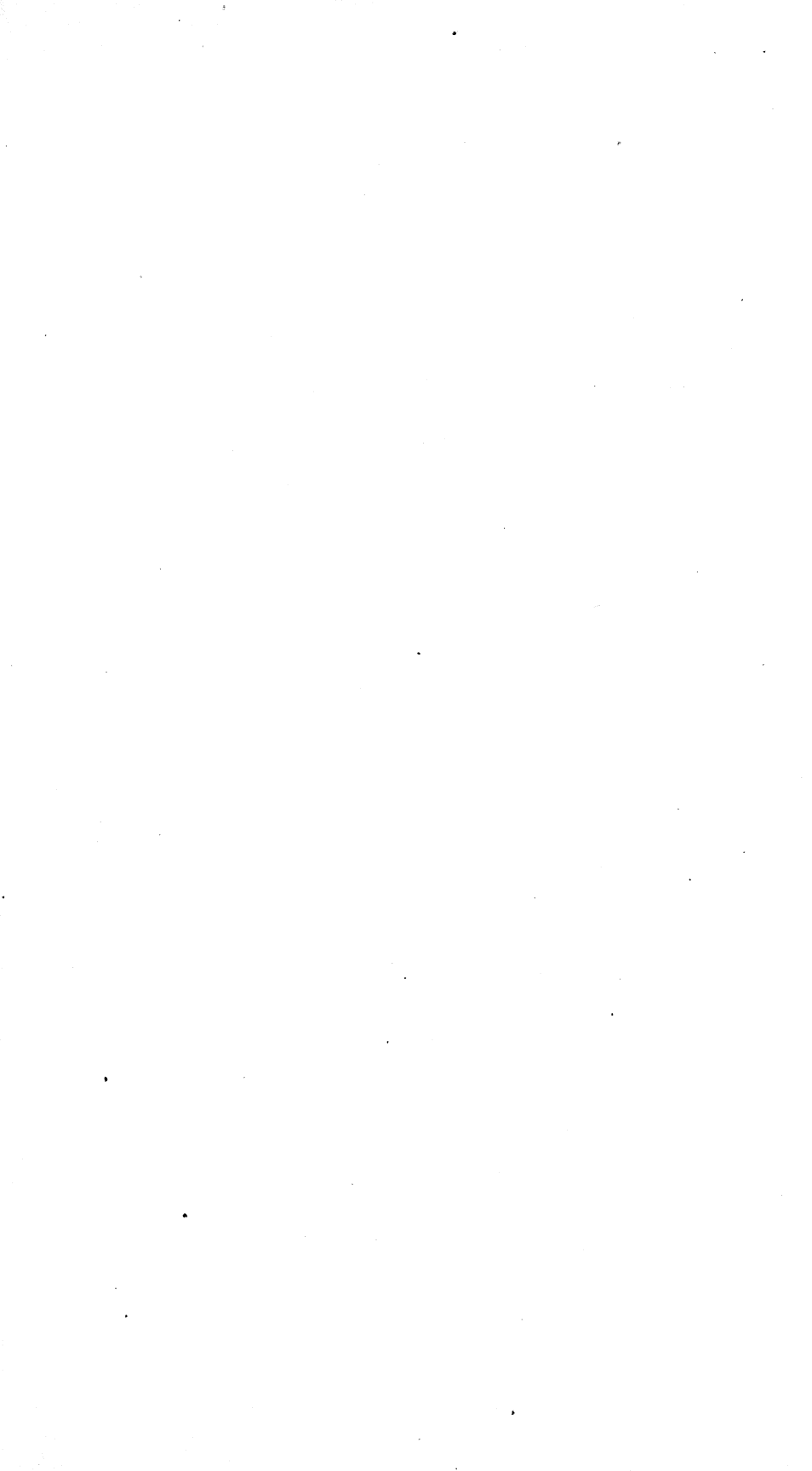
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The Birds of Porto Rico and the Virgin Islands

Colymbiformes to Columbiformes—*Alexander Wetmore*



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# THE BIRDS OF PORTO RICO AND THE VIRGIN ISLANDS

## COLYMBIFORMES TO COLUMBIFORMES

BY ALEXANDER WETMORE

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## INTRODUCTION

The present report on the birds of Porto Rico and the Virgin Islands is one of the series instituted by the New York Academy of Sciences to cover comprehensively the natural history of this region. It is based on extensive field work by the author in Porto Rico and the western Virgin Islands, with inclusion of all published material found dealing with the avifauna of this section down to the close of the year 1926. The present account includes many personal notes not used in the author's previous work on the birds of Porto Rico,<sup>1</sup> which through force of circumstances was prepared mainly as an economic report.

<sup>1</sup> Wetmore, Alex: Birds of Porto Rico. U. S. Dept. Agric. Bull. 326, March 24, 1916. pp. 1-140, 10 plates (one in color) and map. Published also, without change in text, on the same date, as Bulletin 15 of the Insular Experiment Station, Río Piedras, Porto Rico.

In its scope the present work covers Porto Rico and adjacent islands, including Mona and Desecheo, in Mona Passage, and the Virgin Islands from Vieques and Culebra east to and including the island of Anegada, and the outlying island of St. Croix to the south (see Fig. 1).

Although for most of this region the list of birds is fairly complete, there is little or nothing known of the bird life of the many islets adjacent to St. John, Tortola, Virgin Gorda and Anegada. Investigation of these individually is well worth while, since it is important to trace the ranges of well-known birds among them. At the same time there is possibility of the discovery of forms not at present known or whose presence in this region has been unsuspected. Observations on Porto Rico will continue of interest in checking the persistence of native species, in ascertaining unknown facts concerning their lives, and in detecting additional migrants from North America during the winter season.

#### PHYSIOGRAPHY

Brief description of the islands (Fig. 1) included in this report on which ornithological investigation has been pursued will be of value to the reader.

The island of Desecheo (Pl. LV), in Mona Passage, located twelve miles west of Point Jiguero, Porto Rico, is approximately one mile in diameter, rounded in form, with projecting points at the eastern and western ends. In three places there are small bays with sandy beaches, in one of which, on the south side, a landing may be made in small boats. The island rises in steep slopes to culminate in a rounded hill approximately six hundred feet in elevation. The shoreline, except for the bays mentioned, is rocky and abrupt, with limestone ledges much eroded by the weather. In 1912 I found an ill-defined path around three sides, leaving the eastern end difficult of access. The soil is thin but supports a growth of the short-trunked heavy-limbed West Indian birch (*Elaphrium simaruba*), and the palo de burro (*Capparis cyanophallophora*). There are great beds of flat-pad cactus (*Opuntia*) everywhere, and a *Cereus*-like form is also abundant; all are bound by innumerable thorny creepers. A few openings amid the thickets are grown with grass.

Mona Island, also in Mona Passage, thirty-eight and one half miles distant from Cape Rojo, is about six and one half miles long by four miles wide. It is described as a limestone formation with level top that rises on three sides precipitously from the sea to a height of from 125 to nearly 200 feet. On the southwest a rough slope leads down to a terrace elevated ten or twelve feet above the sea. The limestone cliffs are honey-combed with caves in which are many bats. The surface of the island

with its innumerable projecting points and ridges of rock is extremely difficult to traverse, as the sharp edges soon cut through the heaviest shoes. Cactus and shrubs abound, and water is obtained at seeps along the terrace.

Porto Rico, smallest of the principal islands of the Greater Antilles, is approximately ninety-five nautical miles long by thirty-five miles wide with an area of 3,668 square miles. From Mayagüez to Aibonito there extends in a general east and west line the Cordillera Central, with an average elevation of 2000 feet or more that in several points rises in peaks that attain more than 4000 feet. The Sierra de Cayey extends beyond to Humacao. The great mountain, El Yunque, in the northeast part of the island is said from recent calculations to have an altitude of 4895 feet. Easy passage across the island from north to south is afforded by several low divides.

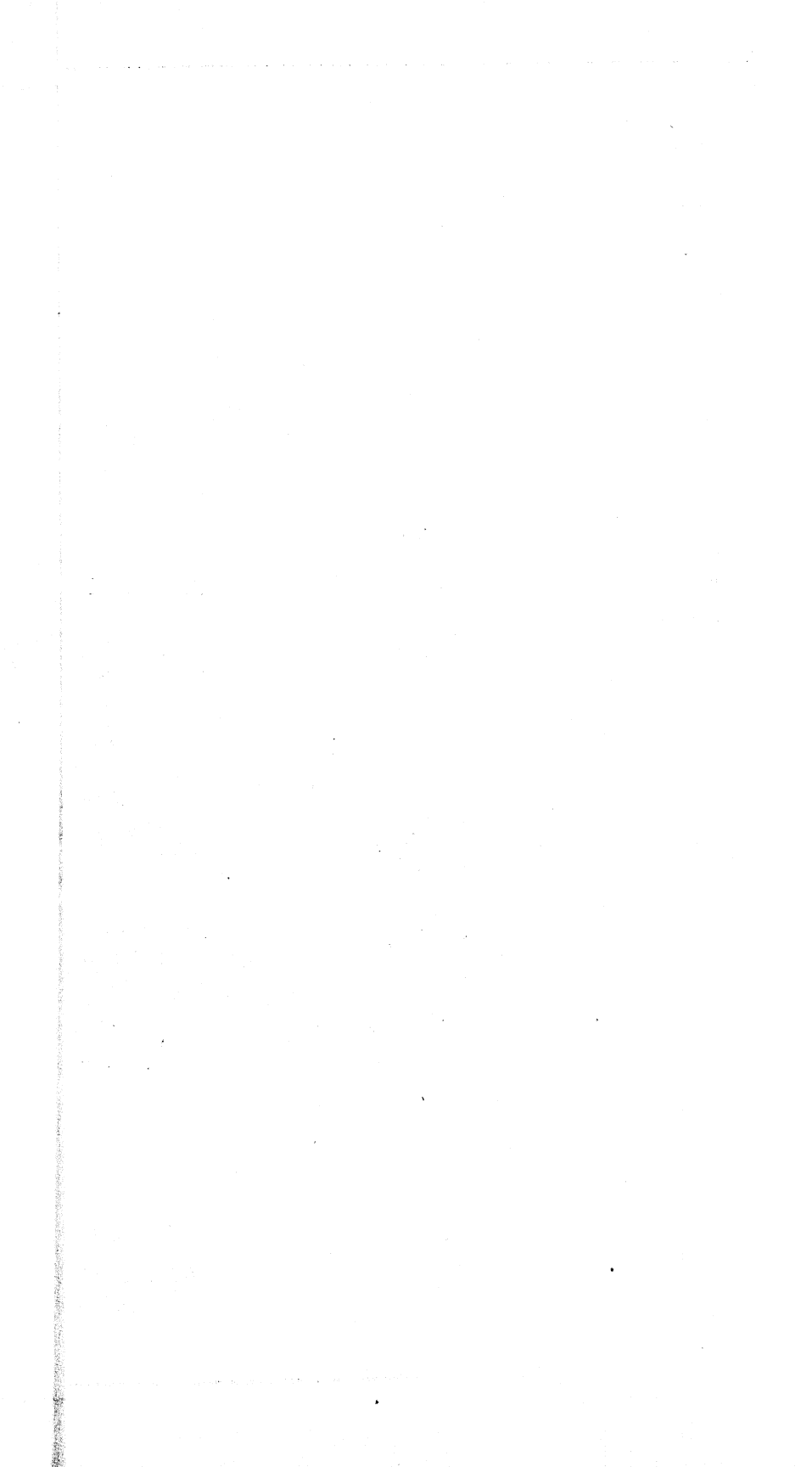
As the mountain range is nearer the south coast, and as the rainfall is governed by the northeast trades, the larger streams flow toward the north. The coastal plain is wide on the north and narrow on the south and is separated from the central mountain mass, mainly composed of volcanic rock, by limestone hills (Pl. LVI) in many places eroded into projecting points that invade the lowland plain and that in some sections, as at Quebradillas on the northwest, reach the sea. The rainfall varies with exposure to moisture-laden winds from an annual fall of 135 inches near the base of El Yunque to twenty to forty-five inches on the south coast between Cabo Rojo and Guayama. Irrigation is now practiced extensively on the south side of the island. Originally much of the island was covered with forest, except for areas of lowland marsh and savanna, and the lower, more open scrubs of the arid sections. The little original forest that remains is now found mainly in the forest reserve of El Yunque de Luquillo (Pl. LVII) and near Maricao, with second growth on hills and poorer lands (Pl. LVIII).

Mangrove swamps and brackish lagoons mark the mouths of the larger rivers; groves of coconuts have been planted back of sandy beaches (Pl. LV), and at the western end of the island are several fresh-water swamps and lakes, the most important being the Laguna de Guánica, and Cartagena and Anegada lagoons in the long valley between Yauco and Boquerón. The lowlands are cultivated extensively in cane, with scattered citrus groves and pastures, and the hills support fields of tobacco or extensive coffee fincas. Dense population (averaging nearly 400 persons to the square mile) has brought so many ecologic changes that life conditions are now unfavorable for some of the indigenous birds.

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The Virgin Islands, discovered by Columbus in 1494, include in all about one hundred small islands and cays.

Vieques Island (Pl. LIX), distant at its nearest point only six miles from the east coast of Porto Rico, is eighteen miles long and three and one half miles wide at the center. Mount Pirata, at the western end, rises 981 feet above the sea, while Mount Jalobre, near the eastern end, is only half as high. A range of low hills, more or less interrupted near the middle, extends for most of the length of the island. Their slopes lead directly to the sea; on the south coast there are rocky headlands rising thirty to eighty feet from the water. In 1912 much of the western half of the island was planted in sugar cane, while the eastern portion was still wild land. On the south coast were extensive areas of low forest, and pastures were grown with dense masses of thorny bushes. There are several small lagoons. The eastern end of the island is still to be explored by zoölogists. The climate is dry, with prolonged droughts at times.

Culebra Island (Pl. LX), sixteen miles east of Porto Rico, is about six miles in length east and west and three miles in greatest width. It has an irregular shoreline. The surface is hilly, with the highest elevation in Mount Resaca, which rises to 650 feet. The island is given over mainly to brush-grown pastures, with dense, dry forest on certain hills. Cacti and other thorny plants are abundant.

A mile southwest of the little town of Playa Sardine, or Culebra, is the islet of Louis Peña, or Southwest Cay, which I visited. This is one and one fourth miles in length and has a wooded hill 475 feet high. The center is low, with hills at either end. Culebrita Island (Pl. LX), less than a mile from the eastern end of Culebra, is a mile in length and has an irregular form. It rises in three hills, the highest being 230 feet above the sea, with low land between, in which there is a small lagoon. The island is covered with forest scrub.

St. Croix, the largest of the American possessions in the Virgin group, is nineteen miles long by five miles in width at the widest point. Mount Eagle, the highest peak, is 1165 feet in height. Much of the land is under cultivation, so that forest growth at present is much restricted. Knox, writing in 1852, has related that, about 1650, colonists on St. Croix found the island so unhealthy that finally they set fire to the extensive forests and burned off the densely wooded covering of the entire island. To this supposed conflagration has been attributed the present-day paucity of species in the island fauna. Eggers and Bland,<sup>2</sup> however,

<sup>2</sup> Ann. New York Acad. Sci., Vol. II, 1880, pp. 117-126.

discredit this tale, since Père Labat, who visited St. Croix in 1700, four years after it had been abandoned by the French, reports it as heavily forested, and forests covered the island on the arrival of the first Danish settlers in 1739. The forest growth has disappeared, having been cut away during the steady increase of cultivation.

St. Thomas is twelve miles in length and averages three or four miles in width. A range of hills extends throughout its entire length, with spurs radiating toward the sea. The greatest elevation, West Mountain, is 1550 feet in height. There are rocky headlands projecting along the coast and the level land is relatively small in extent. Much of the island is covered with brush and trees.

Sail Rock, so called from its resemblance to a vessel under sail, is about one hundred yards in diameter and rises to a height of 125 feet. Many birds are reported here at some seasons. Cockroach Island, three miles northwest of St. Thomas, is of irregular shape, with a precipitous southern shoreline and small indentations on the north. Cricket Rock, a half mile distant, of small size, is bold and abrupt, with pinnacle rocks at its summit. Water Island, at the entrance to St. Thomas harbor, is a mile and a half long and nearly three hundred feet high, and is covered with trees and underbrush. Buck Island, two miles south of St. Thomas, consists of two islets of irregular form partly covered with scrub. On the western islet there is located a lighthouse. Saba Island, between eight and nine miles southwest of the town of St. Thomas, and approximately two miles from the nearest point of St. Thomas Island, is a small cay that rises at the west to a hill two hundred feet high. At the low north end are two small lagoons. Audubon's shearwater has been collected here. Congo Cay, a high rocky island on which seabirds are said to nest, is adjacent to Lovango Cay on the north, and lies north of the western end of St. John.

The island of St. John is eight miles long with an irregular shoreline. The island is hilly, rising in Bordeaux Mountain to 1277 feet, with extensive growths of scrub. Tortola has a length of ten miles and a breadth at the widest point of three and one half miles, with rugged hills that rise from the shore to culminate in Mount Sage (1780 feet). Ginger Island, an islet between Tortola and Virgin Gorda, rises 500 feet above the sea. Virgin Gorda is rough and rugged, with many huge blocks of stone exposed along its western side. Virgin Peak, the highest point, is 1370 feet high.

The island of Anegada, covered with low scrub, is quite different in aspect from those that have been described; for, while nine miles in length and from one to two miles in breadth, it is only about thirty feet in

height. There are extensive salt-water lagoons in the interior. The island should form a highly favorable point for the study of the migration of shorebirds.

Most of the biological work in the Virgin Islands to date has been carried on, through force of circumstances, in the vicinity of the settlements found on the larger islands. A few islands that have been visited by naturalists have not yet been reported upon, so that nothing has been said above regarding them. The multitude of other islands in the group will well repay the visit of the zoölogist, since the life of this section of the West Indies cannot be said to be known until all the cays and islets have been investigated. It is not improbable that some of the rarer petrels may have their breeding grounds in places where they may nest unmolested by the mongoose, and it is even possible that there may exist on some individuals of supposed extinct species known at present only from their bones discovered in caverns.

#### ITINERARY

Personal field work of the author in the region here under discussion was carried on through a coöperative arrangement between the Bureau of Biological Survey, U. S. Department of Agriculture, and the Insular Government of Porto Rico, and was directed principally toward the accumulation of data for an economic study of the bird-life. During the necessary field survey extensive collections of skins were made, with comprehensive field notes on distribution and habits. Investigations were carried on in all sections of Porto Rico, so distributed as to cover the island thoroughly at different seasons. In addition, a visit was made to Desecheo Island, and a journey into the islands to the eastward to include those that at the time were a part of the American possessions in these waters. Below is the detailed itinerary followed (see Fig. 1).

On December 13, 1911, I reached San Juan, Porto Rico, from New York by the steamer *Caracas*, of the Red "D" line, and after two days delay spent in securing necessary permits for collecting birds and for importing my outfit, began work at Río Piedras (Pl. LVIII) on December 16. With the exception of a short trip to Fajardo on December 29 and 30, in company with Mr. J. T. Crawley, Director of the Sugar Experiment Station, and Mr. L. S. Murphy, of the Federal Forest Service, work was continued here until January 4, 1912. On January 5 I went to Caguas and worked for ten days about the tobacco fields and cane-fields in the Caguas Valley. From here a visit was made on January 12 to the caves at Aguas Buenas, where a number of bats were collected. From Caguas I went by coach on January 15 to Cayey, which is situated



approximately 1250 feet above the sea, remaining there until January 25. From January 26 to February 5 I was on the high plateau at Aibonito, studying the avifauna of the coffee plantations and small patches of natural forest and finding in the cool nights and mornings a welcome change from the heat of the lowlands. Returning via Caguas to San Juan, I reached Mameyes at the foot of El Yunque (Pl. LVII) on February 9, where, after some difficulty, lodging was obtained through the courtesy of Señor Eugenio Mendez. Until the twenty-ninth I worked here near the cultivated fields, or made excursions into the extensive mangrove swamps and shallow bays of the coastal region.

On March 2, having made previous arrangement with Señor Miguel Mir in Mameyes, I proceeded on horseback to the Hacienda Catalina, at eight hundred feet elevation, on El Yunque (Pl. LVII), while a collecting chest and a few personal belongings were borne there on muleback. From here long trips were made into the extensive areas of natural forest comprising the Luquillo Forest Reserve to obtain parrots, crows and the rare Porto Rican tanager, known at that time only from this mountain. On March 8, after a long climb through a dripping tropical forest whose trees, stunted in the higher altitudes by the power of the trade winds, were covered densely with epiphytic plants and creepers, I attained the summit of El Yunque.

After I returned to Mameyes on March 11, a few days were consumed in packing collections and in a necessary journey to San Juan. On the sixteenth, chartering a small sloop in company with some Porto Rican gentlemen, I crossed to Vieques Island (Pl. LIX). Landing at the western end, I proceeded on foot to the town of Isabel II, leaving the boat to beat slowly along the coast against the adverse trade winds to Port Mulas. On Vieques Señor José Barton accompanied me on a number of trips into the surrounding country, and from Dr. J. S. M. Pressley and Mr. H. Stiles many favors were received. On April 5 I crossed on the sloop carrying the mail to Culebra Island and remained there until the twenty-first (Pl. LX). Don Pedro Marqués kindly placed a convenient house at my disposal, as there was no hotel, and to him thanks are due also for other favors. On the eleventh Louis Peña Island, called Southwest Cay on some charts, was visited in a rowboat, and on the fifteenth a trip was made to Culebrita Island (Pl. LX), from which St. Thomas and other islands in the Virgin group were plainly visible.

Returning via Vieques to Fajardo—a two-days journey, though the distance is relatively short—I sent my collecting outfit to San Juan on a schooner. After a side trip of a day to Naguabo I continued on April 24 to San Juan. On April 25 I went by railroad to Salinas, remaining

there until May 2, and then proceeding to Guayama. On May 3 I reached Yabucoa (Pls. LVIII and LIX) by coach, where I tarried until the eleventh, collecting and observing in the cane-fields. On the way back, I spent part of May 11 near Maunabo, and until the thirteenth I was at Patillas. Then, on the sixteenth, I again set forth from Guayama by railroad to Yauco (Pl. LVI) and made that my headquarters until May 28. Inland there were broken hills with tobacco, coffee and small crops, while the lowlands were devoted to cane. The Laguna de Guánica, with its extensive fresh-water swamps, offered several novelties and birds were common all through the neighboring hills. I proceeded to Mayagüez, and thence to Maricao, in the heart of the coffee district, where, on May 29, I obtained quarters in the police cuartel, as the hotel was full. On June 5 I returned to Mayagüez and spent the succeeding two days at the Federal Experiment Station, and from June 7 to 8 I was at Añasco. I came to Aguadilla (Pl. LV) on the ninth, and on the thirteenth crossed in a small boat with two men to the uninhabited island of Desecheo (Pl. LV). After some trouble with the swift currents drawing around the island, we landed on a rocky beach, where we unloaded the boat and finally drew it up out of reach of the waves. Forced by a failing water supply to leave on the sixteenth, we reëntered Aguadilla Bay that afternoon. After packing and shipping the collections on hand, I went inland to Lares on the eighteenth, taking my outfit in a large auto truck which made regular trips to that town. Until July 1 I was occupied here about the apiaries and in the coffee plantations, and then returned to Aguadilla.

From July 2 to 6 I was at Quebradillas and then went to Manatí, where I remained until the eleventh, collecting in the extensive citrus groves of that region. At Ciales, farther inland, a coffee region with areas of small crops was visited from July 12 to 18, and then, after I returned to Manatí, the journey was resumed next day to Bayamón, where work was carried on until the twenty-fifth. Comerio, the next point, in the heart of the tobacco country, was reached by coach, and here a sojourn was made until July 31, though few birds, and those of little interest, were found. From Bayamón I rode through, on August 2, to Toa Alta, returning the same day. On the third Arecibo was reached by railroad, and from there a journey by coach was made to Utuado, where I remained until August 9. From the tenth to the sixteenth I collected along the high ridges above the town of Adjuntas, at elevations two thousand feet above the sea. Descending to Ponce, I visited the dry region about Juana Diaz from August 17 to 22. After an inconvenient railroad journey, Cabo Rojo was reached on the twenty-fourth and the

coastal region to the west and the long reaches to the south were explored until August 31. Desiring to make observations at one more point on the east coast, I went to San Juan, crossed to Caguas, and there secured a coach for Humacao, where I worked from September 3 to 9. Returning to San Juan on September 11, I sailed for New York on the steamer *San Juan*.

### HISTORICAL ACCOUNT

Though occasional notes on the avifauna of Porto Rico are found in accounts of early explorers and priests, the first narrative giving any detailed list of the bird-life is that of Andre Pierre Ledru, published first in 1810 in French, and later translated into both German and Spanish. Ledru was primarily botanist on an expedition under Captain Baudin; the birds collected were evidently prepared by his companions, Maugé and Riedlé. Upon these skins, placed in the Paris Museum, are based descriptions of several of the endemic species of the island. The list of birds given by Ledru numbers eighty-three species and he includes a few notes on habits, which are elaborated in an appendix by M. Sonnini. As a whole, this list has little value, for it consists of a random collection of names many of which have no place in Porto Rico, as they cannot be identified with species existing there within historical times. The expedition was on the island from July 17, 1797, until April 13, 1798, confining its attention almost entirely to the north side. Many observations of interest regarding forests, people and towns are given in the report, but there is comparatively little of natural-history bearing.

About February 17, 1835, C. Moritz, an entomologist, came to Porto Rico from St. Thomas and collected on the island for four months. He landed at Arecibo, went in turn to Manatí, San Juan, Caguas, "Coramo" (probably Coamo), Ponce and Guayama, and for a large part of his stay was located at Yabucoa, on the east coast. In his account, written from Caracas in January, 1836, he speaks of wild swine in the mountains, and gives an entertaining account of his natural-history observations on the island, including many made on the birds. Parrots were said to visit the maize-fields in hordes, but paroquets were known to him by report only, none being seen.

In 1847 Dr. Hartlaub, in a discussion of the bird-life of the West Indies, printed in Oken's *Isis*, devotes two paragraphs to Porto Rico, listing twenty-five species after Lesson and Vieillot, and says that the avifauna is similar to that of Santo Domingo.

Mr. E. C. Taylor, in the course of studying the birds of the West Indies, reached Porto Rico May 2, 1863, and remained for a fortnight.

collecting mainly near San Juan. He spent three or four days on an estate known as "Punta," on the Río Loisa, where he encountered several species new to him. In a general account of the birds seen during his trip, many notes on Porto Rican species are incorporated, and in the introduction he remarks that Porto Rico is richer in bird-life than are the Windward Islands, and notes especially that it abounds in pigeons.

Mr. Robert Swift, of Philadelphia, and Mr. George Latimer, for many years Consul General for the United States at San Juan, made collections of birds in the early sixties and presented them to the Smithsonian Institution. Many of these skins are still preserved in the collections of the U. S. National Museum. Dr. Henry Bryant reported upon the specimens secured in the Proceedings of the Boston Society of Natural History for 1866, describing a number of species and subspecies, and Professor Baird, in his Review of North American Birds, named as new *Vireo latimeri* and *Dendroica adelaidae*, taking as his types specimens collected by these gentlemen. Dr. Bryant was evidently impressed and interested by the birds he handled, as he personally made an expedition to the island. Unfortunately, he became ill and died in Arecibo on February 2, 1867.

A collection of Porto Rican birds numbering seventy-three species was made in 1867-1868, near Arecibo, Manatí and Vega Baja, by Justus Hjalmarson, a druggist in Arecibo, who sent them to Professor Sundevall. In reporting upon these in 1869, Dr. Sundevall included also records from the lists of Hartlaub, Taylor and Bryant, bringing the total known for the island to ninety species. Later this collection was examined by Gundlach, from whose notes it is possible to clear up one or two uncertainties in Sundevall's list. A few duplicate specimens retained by Sundevall have found their way through exchange into the collections of the U. S. National Museum.

Following this came the most important work of the early ornithologists on the island. On June 14, 1873, Dr. Juan Gundlach, the untiring Cuban naturalist, came to Mayagüez at the solicitation of the Jesuits, and remained until December 4, collecting at Mayagüez, Aguadilla and Quebradillas, and making an expedition to the expanse of fresh-water marshes around the Laguna de Guánica. The results of his work were embodied in a report published in the Journal für Ornithologie in 1874. Including the species given by previous authors and records secured from other sources, he lists 145 species, of which he had collected personally 116. September 14, 1875, he returned to Porto Rico, on this occasion remaining on the island for almost a year. As on his previous visit, he began work at Mayagüez, from which point he made an excur-

sion to the swamps and lagoons at Boquerón. Later he visited the region about Quebradillas, and in April, 1876, reached Arecibo, where he enjoyed the pleasures of companionship with Hjalmarson and was permitted to examine the collection reported upon by Sundevall. At Vega Baja he added to his collections, and passed some time in Utuado, in the interior, where he was still remembered at the time of my visit in 1912. In July he learned that Cuban rebels were in the neighborhood of his plantation in Cuba and resolved to go home. Returning to Arecibo, he went thence to Bayamón, where he met Dr. Stahl, and then on to San Juan. Failing to get passage for Cuba here, he came finally to Mayagüez, and on August 25, 1876, sailed for Havana.

Besides the collections which he made personally, Gundlach obtained information from Don Tomas Blanco, a druggist in San Juan, who had formed a collection of birds and placed them in the Jesuit College there. Later Blanco sent him specimens secured near Aguas Buenas, some of which came to our National Museum. Dr. Domingo Bello, of Mayagüez, who had published a list of birds of Porto Rico in 1871, also furnished several records from drawings made on the basis of specimens gathered by Dr. Celedonio Carbonel, of Cabo Rojo. Gundlach in 1878 published in Spanish an extended list of the birds of Porto Rico, including 153 species, with notes on their habits and occurrence—the most complete that had appeared.

Stimulated by Gundlach's example, Dr. Augustin Stahl, at Bayamón, gathered a considerable collection representing various branches of natural history, which was finally placed on exhibition in San Juan. His catalog recording 156 birds, of which six are domesticated species, is dated 1882 on the title page, though the cover bears the date 1883. Further notes by him appeared in *Ornis* for 1887. His activities added several birds to the list of species known from the island.

In the early part of 1889 Mr. Clark P. Streater visited Porto Rico for Mr. C. B. Cory, and in February and March of 1892 W. W. Brown, Jr., also collected in Porto Rico. There may be mentioned in addition the visit of Dr. Ernst Hartert, who in the course of his journeys came to San Juan May 20, 1892, visited Mayagüez May 22, and collected near Ponce May 23. A brief account of his experiences is included in his book of travel.

With American occupation of the island, renewed attention was paid to its natural resources, and almost at once an investigation of the aquatic life was undertaken by the Fish Commission, work being carried on from the steamer *Fish Hawk* from January 2 to February 21, 1899. In behalf of the Smithsonian Institution Mr. A. B. Baker joined the

expedition, devoting his attention chiefly to the terrestrial vertebrates. A good series of bird skins was prepared, part of them collected by Dr. J. D. Milligan but, though a report on these was projected in conjunction with the papers which have appeared on the fishes and invertebrates, it was never undertaken.

In 1900 Dr. L. Stejneger and Dr. C. W. Richmond were in Porto Rico from February 12 to April 19, and formed a considerable collection of birds. The large mountain, El Yunque, was visited in March, and among other valuable specimens eight of the rare Porto Rican tanagers (*Nesospingus speculiferus*) were collected. Dr. Richmond later permitted me the use of his specimens and kindly placed at my disposal manuscript notes made during his journey, which have supplied valuable records.

During this same period Mr. B. S. Bowdish was devoting as much time to the study of the avifauna of Porto Rico as his military duties would allow. His observations on the island extended from February 22, 1899, to February 16, 1900, and from May 5, 1900, to October 24, 1901. In the course of his second stay on the island he visited Aguadilla and continued observations at Mayagüez. During the latter part of his work he collected for the U. S. National Museum. His report, published in the *Auk*, is full of interest, and with other notes which appeared in the *Oölogist* forms the next complete account of the birds of the island. He gives notes on ninety-one species and a supplementary list of seventy more derived from previous authors.

The extent of the work of the present writer in Porto Rico may be ascertained from the itinerary which has just been presented. The report published as the outcome of his work includes 162 *bona fide* forms for Porto Rico, Mona, Desecheo, Vieques and Culebra.

During the spring of 1912 W. W. Worthington also made a collection of birds on Porto Rico for the Carnegie Museum, in which were included two new records for the island, the black-throated green and mourning warblers, announced recently by Mr. W. E. Clyde Todd.

As part of the work instituted by the New York Academy of Sciences, Mr. H. E. Anthony visited Porto Rico from May 31 to August 2, 1916, and made extensive collections of bones from caverns and aboriginal shell-heaps. Though his trip was undertaken primarily to obtain mammalian remains, his collecting included considerable numbers of bones of birds. These came subsequently to the hands of the present writer for study and led to the description of six extinct forms of birds not previously known from the island, among them a crow, a barn owl, a caracara, a snipe and a quail-dove. The sixth species, a whippoorwill, revealed

by its bones, was described and named from the only skin extant, in the collection of the Field Museum, where, confused with the whippoorwill of North America, it had remained unnoticed since it was collected by Streater in 1889.

Mr. J. T. Nichols, also working for the New York Academy of Sciences, has published observations on a few water birds observed at the Laguna de Guánica on July 27, 1914. These included the least tern, the two species of yellowlegs, and some other sandpipers.

Dr. Glover M. Allen and Mr. James L. Peters were in Porto Rico on behalf of the Museum of Comparative Zoölogy in the winter of 1916-1917 and secured additional extinct bird material from caverns and middens. Mr. Peters was on the island from about January 23 to February 14, 1917, and again for a day or two early in April. As an outcome of this work, Peters differentiated the grasshopper sparrow as a new form, which he called *Ammodramus savannarum borinquensis*.

From the fall of 1921 through part of the succeeding year Mr. Parke H. Struthers, of the University of Porto Rico, at Mayagüez, carried on studies of the birds of Porto Rico, particularly of their breeding in the western part, mainly in the area easily accessible from Mayagüez, but extending through much of the western two-thirds of the island west of a line drawn between Arecibo and Ponce. His data, published in the Auk for 1923, give much valuable information supplemental to facts already known, especially as he obtained some species that had not been seen for many years before.

Mr. F. A. Potts has made extended observations on the birds of Porto Rico for a period of several years, chiefly along the south side of the island—first near Aguirre and later near Guánica. His studies have taken him to the summit of El Yunque and elsewhere along the high mountain range that divides the island, and have yielded many records of value that he has kindly forwarded to me from time to time for inclusion in this account. His observations (published in part in the Auk, 1927, pp. 120-121), particularly on various migrants from North America, will be found at various points in this paper.

Ornithological work by Mr. Stuart T. Danforth began in October, 1921, and with breaks of longer or shorter duration has continued until the present time. Mr. Danforth's observations have been made mainly in western Porto Rico and have included especially a detailed study of the bird-life of Cartagena Lagoon. He has announced records of a number of species new to the island avifauna and has described new forms from resident birds that he has collected. His detailed paper on the birds of Cartagena Lagoon, replete with observations of interest and

value, is the most recent extended account that deals with Porto Rican birds.

A small collection of animal bones secured from a kitchen midden on the Mesa Hill near Mayagüez, and sent to the U. S. National Museum by Mr. Rafael Vidal, included several bird bones, among which were those of the extinct quail-dove *Oreopeleia larva*.

Though Mona Island was one of the landmarks in Mona Passage for early voyagers, I find no mention of birds from it until 1878, when Gundlach wrote that he saw wings of a paroquet killed by Dr. Block, of Mayagüez, during an excursion to Mona. W. W. Brown, Jr., collecting for C. B. Cory, visited Mona Island in February, 1892, and secured a number of birds, among them the paroquet and the yellow-shouldered blackbird. He reported the tropic-bird and brown booby as breeding. B. S. Bowdish visited Mona from August 5 to 21, 1901, and among other birds collected the type of the ground-dove, *Chaemepelia passerina exigua*. Mr. Karl P. Schmidt, during field work for the New York Academy of Sciences, landed on Mona in 1919 and, though he devoted his attention principally to reptiles, has included in the introduction to his account of the herpetology of Mona a list of twenty-two species of birds—the only complete, separate list that has been published. Mr. Parke H. Struthers worked on Mona from July 14 to 18, 1921, and the cavern deposits of the island were investigated by Mr. H. E. Anthony in the spring of 1926. Various others have gone from Mayagüez to Mona from time to time, but no account of their observations on birds has come to my attention.

The island of Desecheo, called Zachee by Labat, was well known to early voyagers as a landmark in Mona Passage, but was not visited by a naturalist, so far as I am aware, until Bowdish landed there, June 24, 1900, and again sojourned there from July 6 to 10, 1901, though Gundlach, passing near the island in 1874 on one of his voyages from Cuba, had remarked on the large number of seabirds seen near it. I visited the island personally from June 13 to 16, 1912, and made a thorough study of the colonies of breeding birds. Struthers went there in January, 1922, and again in 1926, and the island has been visited by others, who seem to have published no notes regarding their observations. Following my report to the Biological Survey on the birds found there, Desecheo was made a bird reservation on December 19, 1912, and placed under the jurisdiction of the U. S. Department of Agriculture.

The island of Vieques is said to have been first inhabited by civilized man in 1524. It was early noted for its birds, particularly for paroquets, which are mentioned especially by Hans West at the close of the



eighteenth century and by Labat. West also reports the flamingo and doves. According to Newton, Apotheker Riise of St. Thomas sent a collector to Vieques about 1860, who secured a number of birds, including the woodpecker, the lizard-cuckoo and one specimen of *Molothrus atronitens*. No complete list of his collection seems to have been published. So far as known, the island was not visited again by ornithological collectors until 1899, when Mr. A. B. Baker and Dr. J. D. Milligan, of the U. S. Fish Commission steamer *Fish Hawk*, landed there on February 6, 7 and 8. Mr. B. S. Bowdish went to Vieques about November 5, 1899, and remained until February 10, 1900—the most extended visit made by a naturalist. In 1900 Dr. C. W. Richmond and Dr. L. Stejneger, collecting for the U. S. National Museum, worked on Vieques from March 22 to 28. Subsequently I made a trip to Vieques on March 16, 1912, and remained until April 4, with headquarters in the pleasant little village of Isabel II. Subsequently I was on the island, April 22 and 23, on my return from Culebra. As a result of this work I prepared a separate account of the birds of the island (see Bibliography).

The earliest mention of a bird from Culebra Island that I have come upon is that of a honey-creeper listed by Mr. Cory in the *Auk* for 1891 (p. 37), with no indication, however, of the collector. Mr. A. B. Baker and Dr. J. D. Milligan, of the *Fish Hawk*, seem to have made the first extensive collection of birds on the island. Later, the present writer visited the island from April 4 to April 22, 1912, and secured a representative series of skins.

On April 11 I crossed to Louis Peña, or Southwest Cay, and on April 15 visited Culebrita Island for a day, securing specimens and making observations in each instance.

In an executive order dated February 27, 1909, Theodore Roosevelt set aside the small islands surrounding Culebra (but not Culebra itself) as a preserve and breeding ground for native birds, under jurisdiction of the U. S. Department of Agriculture. The reservation includes the surrounding islets from the Washer and Cactus Cay to Culebrita and Palada cays.

St. Croix was settled early in the history of the West Indies, but except for casual mention in books of travel of a few birds, such as the little blue heron and Florida gallinule, noted by Hans West in 1794, and pigeons and the domestic cock and hen, which, according to Father Labat, had gone wild, little was published on the birds of the island until the comprehensive account of the Newtons in the *Ibis* for 1859, based on field work by Alfred Newton from February 20 to August 6, 1857. and by Edward Newton from March 4 to September 28, 1858. This is the

most extended account that has appeared and is replete with information. A note by Alfred Newton in the *Ibis* for 1860 announced a specimen of *Sphyrapicus varius*, sent to Professor Reinhardt from St. Croix with no indication, however, as to the collector. In the spring of 1890 Cyrus S. Winch visited St. Croix in the interest of C. B. Cory and made a collection that included twenty-four species of birds, as announced by Mr. Cory in the *Auk* for 1891. Mr. M. J. Nicoll from February 19 to 21, 1904, secured skins of eight species on St. Croix, but reported birds as relatively scarce. Dr. Th. Mortensen in the course of his biological work in St. Croix made many observations on the birds, and in 1909 issued in the periodical *Atlanten* an account of the birds that includes records from St. Thomas and other of the then Danish possessions, based on published accounts and on his own notations. This was reprinted in the journal of the Danish Ornithological Society, and was followed by a second article in *Atlanten* in 1910, in which is included an account of the game birds and their hunting. In June and again in September, 1914, Mr. G. K. Noble, in the course of field work in the West Indies for the Museum of Comparative Zoölogy, collected on St. Croix and secured series of the native birds. Though no account of these specimens has appeared, I have been permitted by the authorities of the institution mentioned to examine the skins and to include useful records in the present paper.

Kitchen-midden deposits on St. Croix have given valuable records for a number of birds not otherwise known from the island. The late Theodoor de Booy, working for the Museum of the American Indian, Heye Foundation, during January, 1917, secured bones of birds, while making excavations on the north coast along the western bank of Salt River near its mouth. The skeletal material included the extinct land-rail *Nesotrochis debooyi* and the Porto Rican crow. Additional bones forwarded to the National Museum by Mrs. Hugo Hark from a kitchen midden on the Richmond estate near Christiansted have contributed more remains of the crow and fragments of the red-tailed hawk.

In an historical account of the island of St. Thomas, John P. Knox in 1852 published a brief list of the birds that contained the commoner species of the island. Shortly after, Robert Swift was transferred from Porto Rico to St. Thomas. Here he continued actively to collect specimens of birds, part of which were sent to the Smithsonian Institution and part to the Academy of Natural Sciences in Philadelphia. In 1860 John Cassin published, through the latter institution, a catalog of the birds of St. Thomas. Alfred Newton made brief observations on this island in connection with his studies on St. Croix, and came in touch

with the Danish pharmacist Riise, who subsequently forwarded collections to England from which Selater described *Elainea riisii*. These observations were undertaken in 1860 and 1861. Little is known of Riise, who may have been inspired in his work by Swift; if he made extensive collections, their whereabouts is not known to me. It is possible that birds from St. Thomas received by the Smithsonian from the taxidermist John Akhurst, of Brooklyn, early in 1863 may have come from Riise, but there is no definite indication who collected them. E. C. Taylor, *en route* to Porto Rico, speaks of spending three days ashore at Charlotte Amalie, but makes only casual mention of a few common birds. The next bird collection of importance appears to have been made by F. A. Ober in 1880, while J. E. Benedict and W. Nye, naturalists on the U. S. Fish Commission steamer *Albatross*, secured a good series of skins in the week from January 17 to 24, 1884—the basis for a report in the same year by Mr. Ridgway. Cyrus S. Winch worked briefly in St. Thomas, apparently late in 1889, though only seven species are listed by Cory in his collections on that island. Hartert was there on May 19 and 20, 1892, and Nicoll collected a few birds between February 21 and 24, 1904. Nicoll's published list includes ten species. Theodoor de Booy, in excavating kitchen middens at Magen's Bay, on the north coast, in December, 1916, secured the first specimens of the extinct land-rail, with bones of Audubon's shearwater and other birds. J. L. Peters visited St. Thomas from February 15 to 25, 1917, but accounts of his collections have not yet appeared. According to information kindly furnished me by Dr. Robert Cushman Murphy, R. H. Beck, collecting for Brewster and Sanford, visited Cockroach Island, Cricket Rock, Buck Island and Water Island, near St. Thomas, on August 10, 1916. On August 14 he collected in the eastern section of St. Thomas proper, securing paroquets, yellowlegs, doves and various passerine birds. On August 21, in a visit to Sail Rock between St. Thomas and Culebra, he recorded boobies, noddies and terns, with further noddies on Saba Island (an islet off the south coast of St. Thomas). On August 22 he collected on Tobago Island, near Jost Van Dyke, and on September 4 secured shearwaters and other water-birds on Saba.

The earliest statement regarding the birds of the island of St John that has come to my notice is that of Alfred Newton, who remarks in 1860 that Mr. Riise had recently arrived in Europe with a small but interesting collection of birds made chiefly in St. Thomas and St. John. F. A. Ober collected on St. John in 1880, and among other specimens secured the type of the coot described by Ridgway as *Fulica caribaea*. Cory cites various specimens from St. John and probably had his col-

lectors visit that island, though he did not prepare any definite list of the birds.

Mortensen has reported the tropic-bird and other seabirds nesting on Congo Cay between St. Thomas and St. John.

Tortola, Virgin Gorda and Anegada were visited by Cyrus S. Winch, collecting for Cory, during the winter of 1889-1890. Specimens were taken subsequently by J. L. Peters on Tortola between March 1 and 7, 1917; on Anegada, March 8 to 16, 1917, and on Virgin Gorda, March 17 to 22, 1917. Mr. Peters also visited Ginger Island, between Virgin Gorda and Tortola, on March 23, 1917, being the only ornithologist apparently who has had that privilege.

#### DISCUSSION OF AVIFAUNA

The complete list of birds at present known from the region treated in this report, which covers Mona, Desecheo, Porto Rico and the Virgin Islands east to the Anegada Channel, includes 188 species and subspecies. There are eighteen in addition that have been recorded by other authorities on what is believed to be insufficient grounds, so that they are here placed in brackets as of hypothetical occurrence. Of the entire list there are twenty-six that are at present known only from the island of Porto Rico. Of these endemic species five are described from bones discovered in caverns or kitchen middens, so that no living specimens have been known. These include the following:

<i>Polyborus latebrosus</i>	<i>Tyto cavatica</i>
<i>Capella anthonyi</i>	<i>Corvus pumilis</i>
<i>Oreopeleia larva</i>	

They represent, in the order given, a caracara, a snipe, a quail-dove, a small barn owl and a small crow. The known fragments have come mainly from the interior, from deposits that are probably prehistoric, and may be from 500 to 1000 years old.

There remain twenty-one forms of living birds peculiar to the island of Porto Rico proper, as indicated in the following list:

<i>Accipiter striatus venator</i>	<i>Chlorostilbon maugaeus</i>
<i>Columba inornata exsul</i>	<i>Anthracothonax viridis</i>
<i>Amazona vittata vittata</i>	<i>Todus mexicanus</i>
<i>Saurothera vieilloti</i>	<i>Tolmarchus taylori</i>
<i>Gymnasio nudipes nudipes</i>	<i>Blacicus blancoi</i>
<i>Asio portoricensis</i>	<i>Mimocichla ardosiacea portoricensis</i>
<i>Antrostomus noctitherus</i>	<i>Vireo latimeri</i>

<i>Coereba portoricensis portoricensis</i>	<i>Tanagra sclateri</i>
<i>Icterus portoricensis</i>	<i>Loxigilla portoricensis</i>
<i>Nesospingus speculiferus</i>	<i>Ammodramus savannarum</i>
<i>Spindalis portoricensis</i>	<i>borinquensis</i>

One of these, the lizard-cuckoo, *Saurothera vieilloti*, is reported as having occurred on Vieques and St. Thomas, but casually; so that the records would seem to indicate stray birds out of their usual haunt. There may be, in fact, some doubt as to the authenticity of their occurrence.

Several other species of birds that have been considered ordinarily as peculiar to the Porto Rican avifauna range also to one or more of the smaller islands near by. The paroquet, *Aratinga chloroptera maugei* and the yellow-shouldered blackbird, *Agelaius xanthomus*, occur on Porto Rico and Mona Island. Porto Rico and Vieques share four species endemic in this region, namely, the Porto Rican woodpecker, *Melanerpes portoricensis*; the Antillean flycatcher, *Myiarchus antillarum*; Adelaide's warbler, *Dendroica adelaidae*, and the Porto Rican grackle, *Holochalcus niger brachypterus*. The woodpecker is recorded also from St. Thomas, but very doubtfully. The Antillean flycatcher I am satisfied I heard calling on Culebra; so that it will probably be included in the list for that island eventually, as will the Porto Rican grackle, of which I had report from Culebra.

The Porto Rican grassquit, *Tiaris olivacea bryanti*, ordinarily attributed to Porto Rico alone, ranges also to Vieques and Culebra. A form of clapper rail, *Rallus longirostris* (given in the list beyond as "*caribaeus*"), which is not yet described to science, is found on Porto Rico, *Coereba newtoni*, that is replaced by another form in the other Virgin Islands. The resident yellow warbler, *Dendroica petechia cruciana*, ranges through Porto Rico and the Virgin group so far as the latter area has been explored ornithologically. The Porto Rican crow, *Corvus leucognaphalus*, long supposed to be restricted to Porto Rico proper, is represented in St. Croix by bones found in kitchen middens at two separate localities, which would indicate that it was formerly of regular occurrence on the latter island, though none have been reported in historic times. A curious land-rail, unable to fly, is represented by bones from kitchen middens on St. Thomas and St. Croix and from middens and caves in Porto Rico. It was formerly common, if one may judge from the number of remains that have been found, but is unknown to science except through its bones. There may be mentioned finally the limpkin, *Aramus pictus elucus*, and the yellow rail, *Porzana flaviventer hendersoni*.

*soni*, that occur in both Porto Rico and the adjacent island of Santo Domingo.

The island of St. Croix has one bird peculiar to it: a honey-creeper, *Coereba newtoni*, that is replaced by another form in the other Virgin Islands. A subspecies of the Porto Rican parrot, *Amazona vittata gracilipes* (now probably extinct), is considered peculiar to Culebra Island, but may possibly have occurred in Vieques at an early day. Newton's owl, *Gymnasio nudipes newtoni*, is reported only from St. Croix, St. Thomas and St. John, but may possibly occur on Vieques, and the Virgin Island honey-creeper, *Coereba portoricensis sanctae-thomae*, and a form of elaenea, *Elaenea martinica riisii*, are restricted to the Virgin Islands. Finally, there is a subspecies of ground-dove, *Chaemepelia passerina exigua*, described from Mona Island, that ranges also to Inagua, in the southern Bahamas.

Like other islands in the Greater Antilles, Porto Rico is notable for the list of migrants that visit it from the mainland of North America. These include at present sixty-one forms. Some of these are abundant during the winter months and form an important part of the avifauna of the island. Others are rare and are little known. The list is as follows:

<i>Botaurus lentiginosus</i>	<i>Capella delicata</i>
<i>Mareca americana</i>	<i>Phaeopus borealis</i>
<i>Dafila acuta tzitzihua</i>	“ <i>hudsonicus</i>
<i>Querquedula discors</i>	<i>Bartramia longicauda</i>
<i>Spatula clypeata</i>	<i>Actitis macularia</i>
<i>Nyroca affinis</i>	<i>Tringa solitaria solitaria</i>
“ <i>collaris</i>	<i>Totanus flavipes</i>
<i>Charitonetta albeloa</i>	“ <i>melanoleucus</i>
<i>Circus hudsonius</i>	<i>Pisobia minutilla</i>
<i>Pandion haliaëtus carolinensis</i>	“ <i>melanotos</i>
<i>Falco peregrinus anatum</i>	“ <i>fuscicollis</i>
“ <i>columbarius columbarius</i>	<i>Linmodromus griseus scolopaceus</i>
<i>Porzana carolina</i>	<i>Micropalama himantopus</i>
<i>Circus jamaicensis jamaicensis</i>	<i>Ereunetus pusillus</i>
<i>Charadrius melodus</i>	“ <i>mauri</i>
“ <i>semipalmatus</i>	<i>Limosa fedoa</i>
<i>Oxyechus vociferus vociferus</i>	<i>Crocethia alba</i>
<i>Pluvialis dominicus dominicus</i>	<i>Chlidonias nigra surinamensis</i>
<i>Squatarola squatarola cynosurae</i>	<i>Coccyzus erythrophthalmus</i>
<i>Arremonia interpres morinella</i>	<i>Antrostomus carolinensis</i>

<i>Megaceryle alcyon alcyon</i>	<i>Dendroica striata</i>
<i>Riparia riparia riparia</i>	“ <i>discolor</i>
<i>Hirundo erythrogastra</i>	“ <i>palmarum palmarum</i>
<i>Mniotilta varia</i>	<i>Seiurus noveboracensis</i>
<i>Compsothlypis americana pusilla</i>	<i>noveboracensis</i>
<i>Dendroica tigrina</i>	<i>Seiurus noveboracensis notabilis</i>
“ <i>magnolia</i>	“ <i>motacilla</i>
“ <i>caerulescens caerulescens</i>	“ <i>aurocapillus aurocapillus</i>
“ <i>coronata coronata</i>	<i>Oporornis philadelphia</i>
“ <i>virens virens</i>	<i>Geothlypis trichas brachidactyla</i>
“ <i>dominica dominica</i>	<i>Setophaga ruticilla</i> .

In addition the North American green heron, *Butorides virescens virescens*, has been reported casually from Porto Rico; the bobolink, *Dolichonyx oryzivorus*, is recorded from Porto Rico and Vieques, and the yellow-bellied sapsucker, *Sphyrapicus varius varius*, from St. Croix.

While migrants are under discussion, it may be well to note that two birds—the Caribbean martin, *Progne dominicensis*, and the Jamaican vireo, *Vireo calidris calidris*—nest in Porto Rico and the Virgin Islands, but migrate in fall to some winter home in South America.

Finally, it may be recorded that there are five birds that have been introduced into Porto Rico, viz:

<i>Cathartes aura aura</i>	<i>Spermestes cucullatus cucullatus</i>
<i>Colinus virginianus cubanensis</i>	<i>Estrilda melpoda melpoda</i>
<i>Numida galeata</i>	

Of these the quail and guinea-fowl are now believed to be extinct. There is another form, the troupiial, *Icterus icterus ridgwayi*, that is recorded from Porto Rico and St. Thomas and that is supposed to have been introduced. There is a possibility, however, that the bird may be of *bona fide* status on the list, for specimens seen from St. Thomas offer certain peculiarities of color, not found elsewhere, which may indicate an Antillean race of a species otherwise known from northeastern South America and the islands adjacent to its coast.

A form of quail thought to be *Colinus virginianus virginianus* was brought to St. Croix and at one time was common, but is now extinct. A crested quail, *Eupsychortyx sonnini sonnini*, and a paroquet, *Eupsittula pertinax pertinax*, are reported as naturalized on St. Thomas. The quail, it is said, exists there no longer, but the paroquet is still found.

Further additions to the listed avifauna of this region will come principally from the detection of other North American migrants as casual visitants, from random occurrences of forms of extra-limital range, and

from the discovery of other extinct species in kitchen-midden and cavern deposits. Investigation of these latter sites promises important results, as our knowledge of the extinct fauna of Porto Rico is now based principally upon the material obtained by one expedition, that of Anthony in 1916. Many of the caves in Porto Rico have had much of the soil on their floors removed for use as fertilizer, but there must remain a number that have not yet been explored. Investigation of their bone deposits offers a rich field for study and should yield birds not at present known. As our knowledge of the extinct fauna grows, many apparent anomalies in the present distribution of avian genera in the greater Antilles will be explained. It is the writer's opinion that the key to the puzzle presented by modern distribution of avian life in the Antillean region lies buried in the caves of the various islands, since it seems probable that most, if not all, of the genera concerned originally had representation on all of the principal islands of the Greater Antilles, where a part have persisted to the present day and a part have become extinct through the operation of natural causes controlling life in these regions. The investigation of the deposits in question is one of fascinating interest.

#### ACKNOWLEDGMENTS

In his earlier account of the birds of Porto Rico the writer has made note of the many favors extended to him during his stay on the islands. The friendly reception and hearty coöperation accorded him by those in authority in the Insular Government, and by the many residents in the island with whom he came in contact, are most gratefully remembered, as they made the results obtained in his field work possible.

In preparing the present account, published reports of many authors have been consulted and credit has been given in each case for records or information cited. The author is especially indebted to Mr. F. A. Potts, of Fortuna, Porto Rico, for notes and specimens that have made possible a number of additions to current knowledge of Porto Rican bird life.

During work on the present report the writer was able to spend some time at the Museum of Comparative Zoölogy, where he was accorded every privilege in the examination of specimens and the citing of records. Mr. J. L. Peters, in addition, has given information regarding specimens and his own field work in this region that has added measurably to the results. Dr. Robert Cushman Murphy, of the American Museum of Natural History, has supplied certain data from the skins and diaries of R. H. Beck with regard to St. Thomas and adjacent islets.

The Museum of Comparative Zoölogy, the American Museum of Natural History and the Field Museum have coöperated in the loan of



specimens for examination, and the Bureau of Biological Survey has afforded facilities in the use of field notes and photographs made in its service. The authorities of the Biological Survey have also kindly permitted use of the plates of birds prepared by Mr. L. A. Fuertes as illustrations for an earlier report on the birds of Porto Rico, and also of photographs exemplifying typical sections of the country. The latter were taken by the author during his field work in 1911 and 1912. The line drawings of bones of extinct birds are taken from those used in the original descriptions of the species concerned, through the courtesy of the American Museum of Natural History. The writer wishes finally to acknowledge his indebtedness to his colleagues, Dr. C. W. Richmond and Mr. J. H. Riley, for references and opinions during the progress of this work, and to Dr. H. A. Schwarz, editor for the New York Academy of Sciences for friendly coöperation in arranging the report for the press.

#### METHOD OF TREATMENT

In each of the forms covered in the report that follows, the current scientific name, with the authority, is given first, followed by the English and Spanish names by which the bird is known either locally or in published works. The first reference to literature is, in all cases, that in which the form was first proposed under the accepted name, and includes in parentheses the type locality. There follows a brief synonymy that includes synonyms where an endemic bird has been redescribed, and gives the major pertinent references to the scientific names or common names under which the form has been recorded from Porto Rico and the Virgin Islands. Such references are distinguished from original descriptions by a comma placed after the scientific name and before that of the author. They include in parentheses brief statements as to occurrence or other matters of interest. By consulting this synonymy it will be possible to coördinate names used in lists of older authors with modern usage and so eliminate confusion that may exist in the mind of the student who does not have access to large libraries. There has been no attempt to make the list of references exhaustive or wholly complete, since it is believed that this would be useless labor, but indication has been given of all notes of interest or value, so far as they have come to attention.

The first paragraph in the general account gives in brief a summary of the range of the bird under discussion in Porto Rico and the Virgin Islands. This is followed by statement in some detail of occurrence and habit in the various islands, the order adopted for forms of universal distribution being Mona, Desecheo and Porto Rico on through Vieques, Culebra and the other islands of the Virgin group.

As the writer's previous general account of the birds of Porto Rico, published in 1916 as Bulletin 326 of the U. S. Department of Agriculture, was given over largely to economic discussions, this phase of the topic has been summarized very briefly in the present paper. Detailed discussion of the food and economic relations of the majority of the birds here covered will be found in the paper mentioned. In the case of all resident birds and most migrants there has been added a brief statement of size and color that will assist in field identification. These data are included, as there is no handbook easily available that covers this region. The student will find Dr. F. M. Chapman's Handbook of the Birds of Eastern North America (published by D. Appleton and Company of New York City) a useful work of reference, for though it does not cover the forms peculiar to the West Indies, it gives consideration to the many migrants from North America as well as the majority of the water-birds.

## ANNOTATED LIST OF FORMS

### Order COLYMBIFORMES

#### Family COLYMBIDAE

#### ***Colymbus dominicus dominicus***, Linnaeus

Dominican Grebe, Least Grebe, Tigua, Zaramagullón

*Colymbus dominicus* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 223. (Santo Domingo.)

*Colymbus thomensis*, Ledru, Voy. Ténériffe, Saint Thomas, Sainte-Croix, et Porto-Ricco, 1810, Vol. II, p. 39 ("les files danoises").

*Podiceps dominicus*, Gundlach, Journ. für Ornith., 1874, p. 314 (Porto Rico, specimen); Journ. für Ornith., 1878, pp. 162, 190 (taken only at Laguna de Guánica); Anales Soc. Esp. Hist. Nat., 1878, p. 395 (rare, Laguna de Guánica).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 153 (4 specimens); Ornis, 1887, p. 453 (winter).

*Colymbus dominicus*, Cory, Cat. West Indian Birds, 1892, p. 81 (Porto Rico).

*Colymbus dominicus dominicus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 17-18 (Porto Rico, resident).—Struthers, Auk, 1923, pp. 469-470 (eggs November 5, 1920, to April 2, 1921).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 27-30, Figs. 19-21 (Cartagena Lagoon, breeding).

Apparently a fairly common resident in fresh-water ponds of the lowlands in Porto Rico. Not known from other islands except for the statement of Ledru, an uncertain authority, that it is found in the Danish Islands.

Dr. C. W. Richmond recorded this species in a collection of birds in San Juan prepared by Dr. Stahl, and I have seen a mounted specimen in

the Museum of Comparative Zoölogy (no. 29043) received from Stahl. In the U. S. National Museum there is a skin (no. 59897) received from the Bryant collection, marked Porto Rico without other data.

The Dominican grebe is shy and retiring, but is apparently fairly common, for Mr. F. A. Potts informs me that he found a good many on Coamo Reservoir, north of Santa Isabel, January 23, July 26 and August 25, 1921, but he has seen it only once elsewhere. Struthers noted it in numbers on the larger lagoons of the western part of Porto Rico, and recorded during the period of his observations from November 5, 1920 to April 2, 1921 nests containing from one to seven eggs. After the breeding season he found it congregated in flocks in the open water of the larger lagoons. His notes controvert Stahl's observation that the species is present only as a migrant in winter.

Danforth notes its regular occurrence on Cartagena Lagoon and reports that it nests in the shelter of growths of cat-tail. He found complete sets of eggs to number only from one to three. The nests, placed where water stood from one to three feet in depth, were composed of decaying cat-tail leaves heaped in a rounded mass with a damp concavity at the top in which the eggs were placed. When first laid, the egg is white, but soon becomes deeply stained, as the parents cover the nest on leaving it. He found this grebe breeding mainly in April and May and from September to November, and thought that two broods were reared each year. Natives destroy many eggs.

This species is easily distinguished from the Antillean grebe by its more slender bill and much smaller size, as it has only half the bulk of the larger species. The head and neck appear smaller and more slender in life. The bird is brownish black above, with the sides of the head and the neck in the adult dark gray and the under surface whitish mottled with dusky. In flight across the surface of the water the light tips of the secondaries, it is said, show prominently.

### ***Podilymbus podiceps antillarum* Bangs**

Antillean Grebe, Zaramago, Zaramagullón

*Podilymbus podiceps antillarum* Bangs, Proc. New England Zoöl. Club, March 31, 1913, Vol. IV, p. 89. (Bueycito, Province of Oriente, Cuba.)

*Podilymbus dominicus*, Taylor, Ibis, 1864, p. 172 (one taken, Porto Rico).

*Colymbus podiceps*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (winter specimen, Porto Rico).

*Podiceps carolinensis*, Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Podilymbus podiceps*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190; Anales Soc. Esp. Hist. Nat., 1878, p. 397 (Porto Rico, specimens taken, seen in collection of Hjalmarson).—Stahl,

Faun. Puerto Rico, 1883, pp. 66, 153 (Porto Rico, three in collection).—Cory, Auk, 1890, p. 375 (Virgin Gorda); Cat. West Indian Birds, 1892, p. 81 (Porto Rico and Virgin Gorda).—Bowdish, Auk, 1902, p. 357 (Aguadilla).

*Podilymbus podiceps antillarum*, Wetmore, U. S. Dept. Agric. Bull. 326, p. 17 (Laguna de Guánica, Laguna de Manatí, Bayamón); Auk, 1916, p. 409 (Vieques?); Auk, 1917, p. 56 (Culebra?).—Struthers, Auk, 1923, p. 469, (Porto Rico, resident, nesting).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 30-33, Figs. 22-23 (Cartagena Lagoon, breeding). *Antillean Grebe*, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

Resident in fresh-water lagoons of the coastal plain in Porto Rico, where it has been definitely recorded at the Laguna de Guánica, Laguna de Manatí, Cartagena Lagoon, near Aguadilla, and in ponds near the Bayamón River. Cory has recorded one specimen taken by Cyrus S. Winch on Virgin Gorda. Grebes, probably of this species, were reported to me at Playa Grande, on Vieques Island and from lagoons on Culebra. The species doubtless is found wherever there are suitable marshy ponds. In Porto Rico it is fairly common and probably occurs in all suitable fresh-water ponds where there is sufficient cover for it.

Status of the Antillean Grebe as a form distinct from the bird of the United States is based solely on its smaller size. In the present connection I have been able to examine a fair series from Cuba (including the type of *antillarum*), Jamaica, Santo Domingo (a good series from Haiti, taken by Dr. W. L. Abbott), Porto Rico, Antigua, Barbuda and Guadeloupe. The difference evident is mainly in the wing, which in males (seven specimens) ranges from 120.1 to 124.5 mm., with an average of 122.9 mm., and in females (five specimens) from 111.5 to 116.0 mm., with an average of 114.0 mm. Six others, including the type of the race, with sex not indicated measure from 109.5 to 122.8 mm., so that they fall within these limits. Birds in adult dress from the United States offer the following measurements: males, 128.1 to 133.7 mm. (average, 130.6), and females, 116.0 to 126.5 mm. (average, 122.2 mm). The difference, as stated, is slight, but seems regular and constant, so that Todd's statement (Ann. Carnegie Mus., 1916, Vol. X, p. 170) that *antillarum* cannot be recognized appears invalid.

Two adult females in the U. S. National Museum (Biological Survey Collection) taken at Lerma, Mexico, July 3, 1904, and at La Barca, Jalisco, June 28, 1903, have the wing 108.0 mm. and 116.0 mm. respectively, and a male from Manzanillo Bay, taken by John Xantus in February, 1863, measures 109.0 mm. Thus the breeding bird of Mexico must be identified as *antillarum*, which perhaps ranges throughout Tropical America.

The case is somewhat analogous to that of *Cathartes aura*, the West Indian form of which is found in Mexico.

It may be noted that I have examined a male taken December 28, 1902, at Ocotlan, Jalisco, with a wing measurement of 128.6 mm. This I consider a winter migrant of the northern form. Likewise a bird in the Museum of Comparative Zoölogy (no. 41954) secured from Cuba by Henry Bryant—an immature individual of unknown sex, in winter plumage with a wing measurement of 131.1 mm.—I believe to be true *Podilymbus p. podiceps*, migrant from the north. From this it appears that two forms of this grebe are to be credited to the Cuban avifauna.

This grebe is not rare in suitable localities, as Danforth has reported ten seen in one day on Cartagena Lagoon. Where water is permanent, it is probably strictly sedentary—a circumstance that has resulted in its shortened wing as compared with individuals from North America. It must, however, fly at times, since it occurs on lagoons that in dry seasons contain no water.

On large lagoons it is found swimming about in open water, where it is adept, as always, in evading the shot of the gunner by disappearing mysteriously beneath the surface, or by diving with such celerity as to evade the shot directed at it. It is found at times in small pools, as in the lowland charcos bordering the lower courses of such streams as the Bayamón, where a heavy covering of vegetation, growing in one to three feet of water, gives it opportunity to hide securely on the rare occasions when man invades its haunts. When approached suddenly, it sinks slowly beneath the surface, as though pulled down by some invisible hand; but, if greatly startled, disappears like a flash, trusting always to submergence for escape and never attempting to fly.

Struthers has recorded a nest containing six eggs on February 18, 1922, while on July 9, 1912, I saw grebes engaged in mating antics on the Laguna de Manatí; thus the breeding season appears to vary as for many other birds resident in regions of equable climate. From Cartagena Lagoon Danforth has reported young December 7 and 11, 1923, and March 17 and April 30, 1924. Three eggs constituted the largest set that he observed. Many nests are destroyed by eggers.

Stomachs of birds of this family invariably contain masses of their own feathers, plucked and swallowed, which are regularly ground up and passed on into the intestines. One that I killed had eaten twenty-five crayfish and the larvæ of two dragon-flies.

This species is easily distinguished in the field from the only other grebe of this region by its larger size and its thick bill, which in the breeding season is encircled near its center by a band of dark color. The

upper surface is brownish-black and the lower ashy, with more or less black-spotting visible. In breeding plumage the throat is black; in winter birds it is white, sometimes with a concealed black patch. Birds in worn plumage become very dark below. Even at a distance, the head and neck in life appear thick and heavy.

## Order PROCELLARIIFORMES

### Family HYDROBATIDAE

#### Subfamily PUFFININAE

#### ***Puffinus lherminieri lherminieri* Lesson**

#### Audubon's Shearwater

*Puffinus lherminieri* Lesson, Rev. Zool., 1839, Vol. II, p. 102. ("Ad ripas Antillarum.")

*Puffinus lherminieri*, Wetmore, Proc. U. S. Nat. Mus., 1918, Vol. 54, p. 514 (bones from kitchen midden, St. Thomas).

*Puffinus lherminieri lherminieri*, Bent, U. S. Nat. Mus. Bull. 121, 1922, p. 76 (St. Thomas, breeding).

Audubon's shearwater is recorded as breeding in Bermuda, the Bahamas and islands in the Lesser Antilles. Among bones secured by the late Theodoor de Booy during December, 1916, from an Indian kitchen midden on the shore of Magens Bay, an indentation on the north coast of St. Thomas, I have identified an ulna and a humerus as belonging to the present species—the first known record of the bird for this area. Since then Bent has recorded it as breeding at St. Thomas. I consider it uncertain on the island of St. Thomas proper, and assume that this note applies to specimens taken by R. H. Beck for Dr. L. C. Sanford on Little Saba Island, five miles south of the western end of St. Thomas. Dr. Robert Cushman Murphy informs me that Beck took two adult shearwaters from a burrow there on August 21, 1916, and that on May 9, 1917, he found well-grown young there. Such rocky islands as Cay Lobo (Cross Key) and others in this general region may also afford shelter to the species, as they are suited for its abode.

Audubon's shearwater, about twelve inches long, is sooty black above and white below, with the tubular nostrils and sharply hooked bill characteristic of shearwaters in general. These birds are most active about their island breeding grounds by night, when they crouch on their breasts near their nesting holes or shuffle awkwardly about. The legs are located far back; as a result the birds walk with difficulty and after a few steps sink on the breast. The single white egg is deposited in a

hole or crevice a short distance from the surface. The downy young is dusky gray in color, becoming whitish on the abdomen. Adults may be captured in the nesting hole without trouble by one sufficiently hardy to brave the bites of their sharply pointed bills and the scratch of their strong claws.

The species should be looked for among outlying rocky islets. Further information regarding its occurrence in this region is desirable.

[***Puffinus puffinus*** (Brünnich)?

Manx shearwater

*Procellaria puffinus* Brünnich, Orn. Bor., 1764, p. 29. (Faroe Islands and Norway.)

*Puffinus* species, Wetmore, Proc. U. S. Nat. Mus., 1918, Vol. 54, p. 519 (remains from kitchen midden, St. Croix).

A broken humerus I have examined among bones secured by De Booy from a midden near the mouth of Salt River, on the north coast of St. Croix, is that of a shearwater larger than Audubon's shearwater. It may represent the present species, of which a subspecies, *Puffinus puffinus bermudae*, has been described by Nichols and Mowbray (Auk, 1916, p. 195) from Bermuda. Dr. J. Dwight (Auk, 1927, p. 243) considers *bermudae* a synonym of *Puffinus p. puffinus*, an opinion in which I concur.

The Manx shearwater is similar to Audubon's shearwater in color, but is slightly larger in size (length about 15 inches), with stronger bill and feet. It is found in similar situations.]

[***Pterodroma hasitata*** (Kuhl)?

Black-capped Petrel

*Procellaria hasitata* Kuhl, Beitr. Zool. Vergl. Anat., 1820, p. 142. ("Mers de l'Inde.")

*Æstrelata* species, Wetmore, Proc. U. S. Nat. Mus., 1918, Vol. 54, p. 514 (bones from midden, St. Thomas).

A tibio-tarsus secured by De Booy from a midden at Magens Bay, St. Thomas, I have identified as a petrel of this genus from the form of the cnemial process, but through lack of comparative material I have not been able to decide certainly its specific identity. It is probable that it represents *P. hasitata*.

Though now rare, this bird is hardly extinct, as J. T. Nichols (Auk, 1913, pp. 507-508, 509) has recorded one seen on January 25, 1913, at sea two hundred fifty miles east of Savannah, Georgia.

I wish to place on record also notes made in 1920 from a steamer in passage from New York to Rio de Janeiro that must pertain to this

species. On June 1, near latitude  $30^{\circ}$  N., longitude  $62^{\circ}$  W., I had a glimpse of what I was certain was a black-capped petrel. During the following forenoon three were seen circling back and forth far at one side and at intervals crossing in front of the bow, when they frequently passed within thirty or forty feet of me. Unlike the smaller petrels that accompanied us at times, these paid no attention to the wake of the vessel, and after each approach to the ship veered far out to the side. Flight was fairly swift, performed with stiffly spread wings that were seldom flapped, and with frequent changes of course. The birds seldom rose more than ten feet from the water. Occasionally the three individuals joined and circled near one another, and once all were in the field of my binoculars at the same time. One that I saw several times very near at hand had a dark, apparently black crown, a white line behind it, more or less grayish cast to the back, and white rump and white underparts with a smoky tinge along the sides. The lower surfaces of the wings were white outlined in black, with the dark margin heavier in front. Above, the primaries appeared black. Two more petrels were noted June 3, so the species was recorded from the point first noted in a southeast line to about latitude  $24^{\circ}$  N., longitude  $54^{\circ}$  W.

Individuals may appear near the Virgin Islands at times and, when seen, should be carefully recorded.

Small petrels of unknown species have been noted by A. and E. Newton (Ibis, 1859, pp. 372-373) in the vicinity of St. Thomas and St. Croix, as the latter states that "On the 14th of June, 1858, being between St. Thomas and St. Croix, a pair of small storm-petrels came under our lee for some minutes," and again, "On September 28th I saw some two hundred storm-petrels of a larger size . . . near the harbor of Christiansted." He supposed that these birds were Wilson's and Bulwer's petrels, respectively. Observers should watch for them, as any information regarding petrels from this region is desirable.]

## Order PELECANIFORMES

### Suborder PHAETHONTES

#### Family PHAETHONTIDAE

#### ***Phaëthon lepturus catesbyi* Brandt**

Yellow-billed Tropic-bird, Rabijunco, Chirre de Altura

*Phaëthon catesbyi* Brandt, Bull. Soc. Imp. Sci. St. Pétersbourg, 1838, Vol. IV, p. 98. (Bermuda.)

*Acis tropicorum*, Catesby, Nat. Hist. Carolina, Florida and Bahama Islands, 1743, Vol. II, p. 114 (breeds on little islands at east end of Porto Rico).



Mathews, Auk, 1915, pp. 195-197 (name considered applicable to present species).

*Phaëton?*, Newton, Ibis, 1859, pp. 370-371 (St. Croix).

*Phaëton?*, sp., Bowditch, Auk, 1902, p. 358 (Mona, Desecheo, San Juan harbor).

*Phaëthon aethereus*, Taylor, Ibis, 1864, p. 172 (San Juan harbor).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (quotes Taylor).

*Phaëton aethereus* og *candidus*, Mortensen, Atlanten, Vol. VI, No. 67, June, 1909, pp. 650-651, Fig. 310 (St. Croix: Congo Cay, nesting).

*Phaëton flavirostris*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 163, 191-193 (Isabella, Quebradillas, nesting, near San Juan).—Stahl, Ornith., 1887, p. 453 (breeding).—Gundlach, Anales Soc. Esp. Hist. Nat., 1878, p. 419 (Isabella, Quebradillas, nesting, Punta Salinas, San Juan).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 155 (specimens).—Cory, Auk, 1888, p. 73; Auk, 1892, p. 229 (Mona, breeding); Cat. West Indian birds, 1892, p. 84 (Mona, Porto Rico).

*Phaëthon americanus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 18 (Quebradillas); Auk, 1917, p. 56 (Louis Peña Island, Culebra).—Struthers, Auk, 1923, p. 470 (Mona, Quebradillas).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., August 10, 1926, Vol. XII, p. 151. (Mona).

Found in small numbers along the coasts of Porto Rico, particularly where there are cliffs above the water. It has thus been recorded at Isabella, Quebradillas, Punta Salinas and San Juan. It is common at Mona Island and is reported from Culebra (Louis Peña). There can be little question that tropic-birds that have been noted from Desecheo and St. Croix were the present form.

Mathews (Auk, 1915, pp. 195-197) has indicated that *Phaëthon catesbyi* Brandt should replace the current *P. americanus* for this bird. Since the West Indian bird is closely similar to *P. lepturus* of the Pacific and Indian oceans in color and differs only in size, it may stand as a race of *lepturus* (as proposed by Oberholser, Auk, 1919, p. 556).

The tropic-birds, of gull-like appearance, found near or over the sea, are distinguished at once by the two central tail-feathers that project from twelve to fifteen inches beyond the others as a slender plume that undulates gracefully in the wind. Often one of the long feathers is missing and occasionally birds are seen in which both are broken or gone. They may then be told by the pointed appearance of the tail, which is entirely different from the square or forked tails of gulls and terns. The plumage in general is white with a silken gloss. There is a black mark in front of the eye extending back along the sides of the head, a broad black band on the wing coverts, black tertials and black shafts on the central rectrices. The English name is a misnomer, since in life the bill appears clear coral red.

The species was recorded by Gundlach as breeding near Quebradillas,

with fresh eggs on April 5. The single egg laid is handsomely colored with pinkish, covered with many spots of brown. It is usually laid on a shelf of rock or in some cavelike recess in the cliffs, but in Bermuda the species has been noted nesting on the ground under low bushes or in little depressions in the side of a sand dune. W. W. Brown, Jr., collecting for Cory, found it nesting abundantly on Mona in February.

On April 11, 1912, I recorded six or eight about a rocky point on Louis Peña, an islet near Culebra, and collected two specimens, both adult females. These birds were in breeding condition, but the nests were not discovered. The species was seen in this vicinity also on April 13. On July 5 three were recorded near rocky cliffs on the shore north of Quebradillas. They are reported near San Juan, and may be looked for on the seaward side of the castle. Mortensen notes that they nest on Congo Cay, between St. Thomas and St. John, laying their eggs in crevices in the rock, usually on the face of a cliff.

The birds are strong and graceful on the wing, flying with rapidly beating wings and tail blowing in the wind. On land they are awkward in the extreme and shuffle about by shoving along on the breast, as they do not stand erect. The usual note is a sharp *kik* or a series of sharper, harsher notes.

[*Phaëthon aethereus* Linnaeus

Red-billed Tropic-Bird

*Phaëthon aethereus* Linnaeus, Syst. Nat. ed. 10, 1758, Vol. I, p. 134. (Ascencion Island, South Atlantic.)

*Phaëton aethereus*, Cory, Auk, 1888, Vol. V, p. 74 (Porto Rico); Cat. West Indian Birds, 1892, p. 84 (Porto Rico).

The red-billed tropic-bird is known from St. Vincent, Grenada, Bequia, Carriacou, and neighboring islands in the West Indies, and has been noted casually north to Bermuda. Records for this species for Porto Rico are uncertain and appear to be due to confusion with the related form, as no specimens are known. Cory, cited above, mentions no specimens, and apparently took his notes from Taylor, who mistook the yellow-billed species for this form in birds seen flying in the harbor at San Juan.

The present bird, which should be found occasionally, may be distinguished from *Phaëthon lepturus catesbyi* by the narrow transverse black bars on the back and scapulars.]

## Suborder PELECANI

## Superfamily PELECANIDES

## Family PELECANIDAE

**Pelecanus occidentalis occidentalis** Linnaeus

Brown Pelican, Alcatraz

*Pelecanus onocrotalus occidentalis* Linnaeus, Syst. Nat., ed. 12, 1766, Pt. 1, p. 215. (West Indies.)

Pelican, Knox, Hist. Account St. Thomas, W. I., 1852, p. 221 (Charlotte Amalie, St. Thomas).

*Pelecanus fuscus*, Moritz, Wiegmann's Arch. Naturg., 1836, p. 377 (Porto Rico).—Newton, Ibis, 1859, p. 368 (St. Croix).—Taylor, Ibis, 1864, p. 173.—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603.—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 163, 191; Anales Soc. Esp. Hist. Nat., 1878, p. 416 (Porto Rico, nests June to September).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 155.—Cory, Auk, 1888, p. 70; Cat. West Indian Birds, 1892, p. 85 (Porto Rico, St. Croix).—Bowditch, Oölogist, 1900, p. 72 (Vieques).—Mortensen, Atlanten, June-July, 1909, Vol. VI, Nos. 66-67, pp. 648-649, Fig. 309 (St. Croix).

*Pelecanus occidentalis*, Hartert, Nov. Zool., 1902, Vol. IX, p. 276 (St. Thomas).—Bowditch, Auk, 1902, p. 359 (Porto Rico, Vieques).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 18 (Porto Rico, Vieques, Culebra); Auk, 1916, p. 409 (Vieques); Auk, 1917, p. 56 (Culebra).—Struthers, Auk, 1923, p. 470 (Mona, Porto Rico, breeding near Aguirre and Rincon).—Danforth, Wilson Bull., 1925, p. 76 (San Juan).

Common in occurrence along the shores of Porto Rico. Recorded from Vieques, Culebra, St. Croix and St. Thomas, and must occur throughout the Virgin Islands. Danforth noted a pair at Mona Island, July 16, 1921.

The brown pelican is reputed to breed on the low islet known as Caballo Blanco, off Port Mulas, Vieques Island, but in passing near it in a small sloop on April 23, 1912, I saw no evidence of a colony. I was told that the birds bred also on low islands near the port of Humacao. On May 8, 1912, I saw a young bird three-fourths grown on a mud bank at the mouth of a stream near Yabucoa. Mr. C. Harris, in a letter dated August 27, 1917, states that pelicans nest in mangroves on islands south of Porto Rico, and sent me with his letter a photograph of young in the nest taken during the first week in July, 1917, on an island six miles west of Ensenada. He noted three eggs in nests examined.

These great birds are found most commonly in shallow bays, or where shallows are protected by off-lying reefs. Their food, small fishes,

is secured by diving from the air, at times in very shallow water, and again in greater depths, when the birds may disappear entirely beneath the surface. The pouch serves as a scoop to secure prey, not as is commonly believed—in accordance with the statement of a well-known limerick—as a sack for storage of food, since the fish captured are swallowed and held in the capacious stomach.

Native fishermen relate gravely that, when the alcatraz grows old and feeble, rather than suffer death by starvation it commits suicide by hanging itself by the head from the fork of a mangrove or a crevice between two stones. Those familiar with the clumsiness of the great birds can readily understand that this belief arises from observation of individuals that slip and are caught so that they cannot escape. It is not unusual to find them thus suspended by the head when they nest in trees, for if they slip and fall, they easily become entangled.

Ledru in his work published in 1810 records, p. 210, the white pelican (*Pelecanus erythrorhynchos*), but probably in error, since the only known record for the West Indies of which I am aware is that of a bird secured by Gundlach in Cuba.

Brown pelicans seen in April at Culebra in the main showed the brown feathering on the head and neck that marks the breeding season, though some had the white plumage in this area that signifies winter dress, and some were dark birds still in immature feather. An adult male that I collected February 21, 1912, at Punta Picua, near Mameyes, Porto Rico, was in full winter dress.

## Superfamily SULIDES

### Family SULIDAE

#### *Sula leucogastra leucogastra* (Boddaert)

Brown Booby, Pájaro Bobo, Pájaro Bobo del Mar, Buguere, Buby

*Pelecanus leucogaster* Boddaert, Tabl. Planch. Enl. 1783, p. 57. (Cayenne.)

Brown Booby, Mortensen, Atlanten, June, 1909, Vol. VI, No. 67, p. 651 (Virgin Islands, occasional).

*Dysporus sula*, Newton, Ibis, 1859, p. 369 (near St. Croix and St. Thomas).

*Dysporus fiber*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 163, 191; Anales Soc. Esp. Hist. Nat., 1878, p. 418 (Desecheo Island, coast of Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 155 (specimen from Porto Rico).

*Sula fusca*, Garrod, Proc. Zool. Soc. London, 1876, p. 335 ("Port Lemon, Porto Rico" = Costa Rica?)

*Sula sula*, Cory, Auk, 1888, p. 72; Auk, 1892, p. 229 (Mona Island breeding); Cat. West Indian Birds, 1892, p. 84 (Mona, Porto Rico, St. Croix).—Bowditch, Auk, 1902, p. 358 (Mona, Desecheo, Porto Rico).

*Sula leucogastra*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 19; Auk, 1916, p. 409 (reported Vieques Island); Auk, 1917, p. 56 (reported nesting on rocks near Culebrita Island); Auk, 1918, pp. 337-338 (Desecheo Island, breeding); Bull. U. S. Nat. Mus., 1918, Vol. 54, pp. 514-515 (bones from midden, St. Thomas).—Struthers, Auk, 1923, p. 470 (Desecheo, Mona).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).

Breeding commonly on Desecheo and Mona islands and said to nest on two small rocks north of Culebrita Island. Recorded from the coasts of Porto Rico, particularly near Aguadilla and Mayagüez, Vieques, St. Thomas and St. Croix. Bones found in a kitchen midden at Magen's Bay, St. Thomas.

The brown booby is slightly larger in size than the red-footed species and, when adult, is marked by the white of the lower breast and abdomen, set off by a sharp line from the dark brown of the upper breast and the rest of the plumage. The young are hatched naked but are covered soon by soft white down. In immature plumage the bird is entirely grayish brown, paler below than above, with the primaries blackish. It somewhat resembles the red-footed booby at a similar stage, but is larger and lacks the red feet, besides differing slightly in color.

The brown booby, it is said, nests near Culebrita Island in May and June. On Mona W. W. Brown found these birds breeding in February, while on Desecheo they were said to breed from late June until October. From June 13 to 16, 1912, I noted only grown young, though adults were playing with sticks as if they contemplated nest-building. Two taken showed no development of the sexual organs.

The island of Desecheo, which furnishes a home to the principal colony in this region, lies seven leagues from the port of Aguadilla, on the west coast of Porto Rico. The island, an isolated rock rising from the restless waters of Mona Passage, with its treacherous currents, is hot and dry for a large part of the year, but is swept occasionally by tempestuous downpours of rain.

On this interesting rock, boasting but eleven resident avine forms, the brown booby has established its home, and here from June 13 to 16, 1912, I studied the habits of this ungainly bird. Between eight thousand and ten thousand boobies, at a conservative estimate, occupied the rookeries spread over the entire island, but they were so distributed on the steep, brush-covered slopes that an accurate census was impracticable. Though they were in evidence at the top of the higher of the two hills, the greater number were found gathered in groups within four hundred feet of the beach. The young were nearly all caring for themselves, though a few showed traces of down feathers clinging to the tips of the

feathers about the head. I should consider February or March a probable date for their nesting. Birds in all possible stages of intermediate plumage were seen, and immature specimens were much more common than those fully adult, with smooth dark-brown heads and white underparts.

The young birds were averse to flying when they could avoid it, and preferred to scramble awkwardly away under the bushes, falling over sticks and stones in their haste. Even the adults could not take flight from a level surface, but had to launch themselves from the cliffs and sail down for a distance before being able to rise with strong wing beats. From the limbs of trees they flew readily, but on the ground I captured several by merely pinning them down with my gun barrel as they flopped awkwardly about. They showed little real fear of me, for many, snapping and hissing, stood their ground as I approached; it was the part of wisdom to keep beyond reach of their sharp, powerful beaks. It rather gave me the shivers occasionally to see one or another flounder and flop through and over a bed of prickly pear, but the birds seemed careless of the thorns. Numbers were seen with spines or even small lobes of cactus hanging to the feet or wings, and the dissemination of these plants from island to island by this means can be readily pictured.

At a gunshot there was a great rush among those near by and the air for a few minutes would be filled with birds circling and crossing, frequently almost within reach. The confusion among them would cease gradually and they would presently be all around again, eyeing me curiously or, forgetful of my presence, busy with their own affairs. On the rough limestone blocks above the sea, decorated with splashings of excreta, they sat in rows in the blazing sun, rather upright, occasionally waddling along a foot or two, but usually motionless. Birds came and went during the day, flying out to sea to feed, sometimes for considerable distances offshore, but they were most active in the morning and evening, and at night, whenever I woke, there was always much commotion evident among them. The common call note was a loud *quack, quack, quack*.

Formerly I was told eggng parties visited this island, but the labor involved in the crossing and the difficulty in landing prevented this practice from becoming common and now the birds should be safe, as the island has been made a Federal bird reservation.

It is possible that there has been a decrease in their number, for Scruthers (in litt. March 3, 1922) recorded only 2500 as present during January, 1922. Bowdish, in August, 1901, noted their abundance on Mona Island, but no estimate of the numbers there has come to my atten-

tion. The species seems to feed mainly at sea, since it is seldom seen near the coast of Porto Rico.

***Sula piscator* (Linnaeus)**

Red-footed Booby, Pájaro bobo

*Pelecanus piscator* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 134. (Java Seas.)

*Sula piscator*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 18 (Desecheo); Auk, 1918, p. 337 (Desecheo); Proc. U. S. Nat. Mus., 1918, Vol. 54, pp. 519-520 (bones from kitchen midden, St. Croix).—Struthers, Auk, 1923, p. 470 (Desecheo).

The only known breeding colony of the red-footed booby in this area is that on Desecheo Island, where, curiously enough, the birds had been overlooked until my visit in June, 1912, though Bowdish, in 1900 and 1901, suspected another species among the brown boobies that he saw. I noted the species at sea between Porto Rico and Aguadilla, and it should occur at times along the Porto Rican coast. I have also identified remains of this booby among bones taken from a kitchen midden near the mouth of Salt River, on the island of St. Croix.

Some recent authors have called the present species *Sula sula* (Linnaeus) on the ground that *piscator*, the name in common use, is a composite that cannot be identified. (See Mathews, G. M., Birds of Australia, Vol. IV, Pt. 3, 1915, pp. 212-216, and Auk, 1920, pp. 180-181.) I have discussed the matter fully in another connection (Bull. Mus. Comp. Zool., August, 1919, Vol. LXIII, pp. 167-170) and need not review the matter here. The name *piscator*, as here used, has been accepted for use in the A. O. U. Check-list (Auk, 1923, p. 524).

Plumages in the present species are puzzling. The immature bird when fully grown is sooty gray, paler on the head and lower surface, with a very faintly indicated darker band across the breast and whitish tips on the tail. In a succeeding stage the under surface is white or almost white, with occasionally a few darker feathers to indicate the pectoral band; the head and neck are paler, and there are whitish tips on the dorsal feathers. This is succeeded by the adult stage, in which the entire plumage is pure white, with the primaries black and the greater wing coverts and secondaries tipped with black, the dark color everywhere being obscured by a wash of gray.

There still remains to be mentioned a seemingly aberrant plumage in which the tail coverts, flanks, lower back, rump and tail are pure white and the rest of the plumage dark gray, as in the immature bird. This type of bird has been described by Maynard as *Sula coryi*. It is sup-

posed to represent a phase of plumage of the red-footed booby, but there is still a possibility that it may be a distinct species. The phases of plumage described above are all to be noted in the eight skins that I collected on Desecheo.

The present species, when grown, may be distinguished in any plumage from the brown booby by the distinctly red tarsus and feet.

The red-footed booby ranges widely through tropical and subtropical seas of the world and has recently been divided into subspecies. In material available to me at this moment I cannot distinguish between Pacific and Atlantic birds; I desire to go into the matter more fully a little later in another connection when more comprehensive material is at hand. If the Atlantic bird is separable, it should be known apparently as *Sula piscator sula* (Linnaeus).

On Desecheo in 1912 the red-footed boobies were gathered in a colony in the shrubs and trees above the little cove where I made my camp. At that time (June 13 to 16) young were grown, an indication that the breeding season had come earlier. Fishermen said that they nested from October to December, while Struthers (in a letter dated March 3, 1922) states that they were nesting that year from January 22 to 24. He recorded only two hundred individuals, though in 1912 I had found about two thousand. It is probable that the nesting season may vary somewhat from year to year. These birds seemed more wary and suspicious than the brown booby; they were also more active and took flight more readily. They nest in trees or bushes wherever possible.

The red-footed booby secures its food from the sea by diving and is expert and graceful on the wing. The white birds at rest in the rookery are very conspicuous against the gray-green of the shrubbery.

#### [Family PHALACROCORACIDAE]

##### [*Phalacrocorax olivaceus mexicanus* (Brandt)]

Mexican Cormorant, Fresh-water Cormorant, Corua

*Carbo mexicanus* Brandt, Bull. Sci. Acad. Imp. Sci. St. Pétersbourg, 1837. Vol. III, p. 56. (Mexico.)

*Phalacrocorax*?, Newton, Ibis, 1859, p. 370 (reported from St. Croix).

*Phalacrocorax vigua mexicanus*, Danforth, Auk, 1925, p. 558 (Cartagena Lagoon); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 35 (Cartagena Lagoon, seen).

The Newtons state that "some species of this sort of birds must sometimes occur in St. Croix, according to the accounts we have received," but had no certain record. Danforth notes that "a small cormorant,



which appeared to be of this species, was observed at Cartagena Lagoon on October 17, 1924."

The Mexican cormorant, with the Florida cormorant (*Phalacrocorax auritus floridanus*), is found on Cuba and the Isle of Pines and has been recorded from the Bahama Islands. It is not known from Jamaica or Santo Domingo. As the Porto Rican bird mentioned by Danforth was not taken, there is some uncertainty as to its species; it is, therefore, included here in brackets.

Cormorants are diving birds as large as small geese that fly readily. All four toes are included in a single web and the bill is strongly hooked. At a distance they appear black, while near at hand immature individuals are blackish brown. The Mexican cormorant, which frequents fresh or brackish waters, is smaller, with a wing less than 11 inches in length, while the Florida cormorant, found usually on salt water, is larger, with a wing more than 11 inches long.]

## Suborder FREGATAE

### Family FREGATIDAE

#### **Fregata magnificens** Mathews

Frigate-bird, Man-o'-war Bird, Hurricane Bird, Rabihorcado, Rabijunco, Tijerilla

*Fregata minor magnificens* Mathews, Austr. Av. Rec., December 19, 1914. Vol. II, p. 120. (Barrington Island, Galápagos Archipelago.)

Man-of-war Bird, Danforth, Oölogist, 1922, p. 10 (Mayagüez).

*Tachypetes aquilus*, Newton, Ibis, 1859, pp. 369-370 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 315; Journ. für Ornith., 1878, pp. 163, 191; Anal. Soc. Esp. Hist. Nat. 1878, p. 421 (Porto Rico, all coasts).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 155 (Porto Rico, specimen).—Mortensen, Atlanten, June, 1909, Vol. VI, No. 67, pp. 649-650 (St. Croix).

*Fregata aquila*, Cory, Auk, 1888, p. 69; Cat. West Indian Birds, 1892, p. 85 (Porto Rico, St. Croix).—Bowditch, Oölogist, 1900, Vol. XVII, p. 72 (Vieques); Auk, 1902, p. 359 (Porto Rico, Vieques, Mona).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 36 (Cartagena Lagoon, casual; island near Parguera, nesting).

*Fregata magnificens*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 19-20 (Porto Rico, Vieques, Culebra, Mona, Desecheo); Auk, 1916, p. 409 (Vieques); Auk, 1917, pp. 55, 56-57 (Culebra, Louis Peña); Auk, 1918, p. 338 (Desecheo); Proc. U. S. Nat. Mus., 1918, Vol. 54, p. 515 (bones from kitchen midden, Magen's Bay, St. Thomas).—Struthers, Auk, 1923, p. 470 (Porto Rico, Mona, Desecheo).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).

*Fregata magnificens rothschildi*, Bent, U. S. Nat. Mus. Bull. 121, 1922, pp. 306-315 (Mona and Desecheo, breeding).

Distributed along the coasts of Porto Rico and the Virgin Islands; certainly of universal occurrence, but recorded to date only from Mona, Desecheo, Porto Rico, Vieques, Culebra, Louis Peña and St. Croix. Breeding colonies found on Desecheo and Mona islands, and a small islet opposite Parguera, on the southwest coast of Porto Rico.

The man-o'-war bird of the West Indies is characterized in the adult male by uniform black plumage, with a greenish sheen on the back and a purplish gloss on the breast. The bare throat pouch is orange or brilliant red, according to the season. The female is brownish black with white breast and an obscure brown bar extending along the wing coverts. The bird is distinguished by its large size and long, deeply forked tail. Lowe (Nov. Zool., Vol. XXXI, 1924, pp. 303-305) has upheld Mathews' contention (Birds Austr., 1915, Vol. IV, p. 280) that the man-o'-war bird of the present type that breeds on the Galápagos Islands is different from the West Indian resident because of its larger size. This distinction does not hold in a small series from the western coast of Mexico that I have seen, nor is it evident in the measurements cited by Lowe. The species is here considered uniform, in accordance with the review of Rothschild (Nov. Zool., 1915, Vol. XXII, pp. 145-146). Lowe has given the type locality for *magnificens* as Barrington Island.

In 1912 I found about 175 adults on Desecheo Island, where they nested in four separate colonies, one group near the top of a hill but the majority near the water in company with boobies. In June the nests contained young, mainly about three-quarters grown, with feathers of the immature plumage appearing, though some, not so mature, carried the white down of the first dress. Ordinarily the young sat quietly in their stick nests, occasionally fencing with one another when nests were near together. At my approach they snapped and clattered their bills loudly and, if too closely pressed, gave up offerings of partly digested fish.

During the early morning adults were observed about the rookeries, but from then until evening they spent most of their time wheeling about in the air in flocks, sometimes so high overhead that they appeared as mere specks in the sky. Only occasionally did one descend near the nests. The young apparently were fed morning and evening. At dusk the adults came in to roost and, until all were comfortably settled, there was considerable uproar among them.

Struthers recorded three hundred here in January, 1922, and thirty on Mona in July, 1921. Bent refers to their breeding on Mona. The species lays one egg.

These great birds appear occasionally along the coasts of Porto Rico and the Virgin Islands, and August 1 I observed one in San Juan

harbor, where it soared around, hovering with evident interest above men at work on the water front. Native fishermen connect the presence of the man-o'-war bird with bad weather, as it is seen frequently along the coast during storms. Danforth reported these birds occasionally over Cartagena Lagoon and says that there is a breeding colony on an islet opposite Parguera.

The species is parasitic in its habits, and lives by robbing its neighbors, the terns and boobies, of their prey. At Louis Peña Island, on April 11, 1912, one picked up a tropic-bird that I had shot and carried it a few feet before dropping it into the water.

In addition to a pair that I collected on Desecheo, June 15, 1912, there is in the U. S. National Museum collection a female secured at Fajardo about February 13, 1899.

## Order CICONIIFORMES

### Suborder ARDEAE

#### Family ARDEIDAE

#### Subfamily ARDEINAE

#### ***Ardea herodias adoxa* Oberholser**

West Indian Great Blue Heron, Garzon Ceniciento, Garzon Cenizo, Yaguasa

*Ardea herodias adoxa* Oberholser, Proc. U. S. Nat. Mus., December 12, 1912. Vol. 43, p. 544. (Curaçao Island.)

West Indian Great Blue Heron, Danforth, Bird-Lore, 1924, p. 52 (two, Cartagena Lagoon, December 22, 1923).

*Ardea herodias*, Newton, Ibis, 1859, pp. 263-264 (St. Croix, March, April, August, June 10, 1858, may breed).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, one specimen, winter).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 186 (Porto Rico, specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 352 (breeding, young November, eggs January).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 149-150 (two specimens, Porto Rico).—Cory, Auk, 1887, p. 323 (West Indies); Cat. West Indian Birds, 1892, p. 89 (Porto Rico, St. Croix).—Bowditch, Auk, 1902, p. 359 (Porto Rico).

*Ardea herodias adoxa*, Oberholser, Proc. U. S. Nat. Mus., December 12, 1912. Vol. 43, p. 544 (Porto Rico, St. Croix).—Wetmore, U. S. Dept. Agric., Bull. 326, 1916, p. 26 (Porto Rico).—Struthers, Auk, 1923, p. 471 (Anegado Lagoon, Boquerón).—Danforth, Journ. Dept. Agric. Porto Rico, 1926. Vol. X, pp. 47-48 (Cartagena and Anegado lagoons, San Juan, Mayaguez, Toa Baja, Guayanilla, Boquerón, Cabo Rojo Light).

Fairly common in the coastal region of Porto Rico (one seen near Martin Peña, below Río Piedras, January 2, 1912; vicinity of Mameyes, February 9 to 29, fairly common; two, Laguna de Guánica, May 26; one,

Cataño, August 1). Struthers records it at Anegado Lagoon and Boquerón, and Danforth recently has found it regularly at Cartagena Lagoon, where he collected a female February 27, 1924, and reports it also at Mayagüez, Toa Baja, Guayanilla, Boquerón and near Cabo Rojo Lighthouse. Dr. C. W. Richmond (MSS.) in 1900 saw one on March 3 near Luquillo, and several near San Juan on March 19. Newton many years ago reported it from St. Croix in March, April, June and August, and thought that it might breed. There are no recent records for that island, nor has the species been recorded elsewhere in the Virgin group, though it must occur on other islands.

Gundlach says that he has found young in November and fresh eggs in January, but does not state definitely that these records refer to Porto Rico. Indeed, they may represent observations elsewhere, since in the following sentence he cites localities that include the United States, Cuba, Jamaica and the Bahamas, in which he has seen the species. During the summer, in Porto Rico, this heron is limited in its range and, if it breeds, resorts to remote swamps. I saw birds at that season only at the Laguna de Guánica. Inland it is rare. From January 5 to 14, 1912, one was reported several times along the Río Caguitos near Caguas, but I did not see it.

This bird is found in open reaches amid mangrove swamps or in shallow bays or lagoons. Its large size distinguishes it from all other herons. Gundlach and Stahl had specimens, and Hjalmarson sent one, taken in winter, to Sundevall, but few modern collectors have reported skins. There are none from Porto Rico in the U. S. National Museum and, in fact, skins of the West Indian form of this heron seem rare in collections in general.

### [*Ardea occidentalis* Audubon

Great White Heron, Garzon Blanco

*Ardea occidentalis* Audubon, Birds Amer. (folio) 1835, Vol. III, Pl. 281. (Keys near Key West, Florida.)

*Audubonia occidentalis*, Gundlach, Journ. für Ornith., 1874, p. 313 (seen but not collected; reported by others); Journ. für Ornith., 1878, pp. 161, 187 (large white heron seen); Anales Soc. Esp. Hist. Nat., 1878, p. 354 (a large white heron seen at Laguna de Guánica, reported near San Juan).—Stahl, Faun. Puerto Rico, 1883, p. 64.

*Ardea occidentalis*, Cory, Auk, 1887, p. 324 (Porto Rico); Cat. West Indian Birds, 1892, p. 89 (Porto Rico).

Gundlach included this bird in his list from Porto Rico with the statement: "ví en la orilla de la laguna de Guánica una garza blanca que por su tamaño no puede ser otra que la especie *occidentalis*. Además me

aseguró mi amigo D. Tomas Blanco haberla observado en sus excursiones desde la capital." In another place he remarks: "Ich sah einen sehr grossen weissen Reiher fliegend und später am Ufer der laguna gehend. Ich konnte ihn nur für *occidentalis* halten." He examined no specimens and none have been reported as taken in Porto Rico. As the records are indefinite, the species is here indicated as of doubtful occurrence.

Gundlach's observation at the Laguna de Guánica was made in November, 1873.]

**Casmerodius albus egretta** (Gmelin)

Egret, Garza Real, Garzon Blanco

*Ardea egretta* Gmelin, Syst. Nat., Vol. I, Pt. 2, 1789, p. 629. (Cayenne.)

American Egret, Danforth, Bird-Lore, 1924, p. 52 (one, Cartagena Lagoon, December 22, 1923).

*Ardea egretta*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208 (Porto Rico).—Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (cites Bryant).—Cory, Auk, 1887, p. 324 (Greater Antilles); Cat. West Indian Birds, 1892, p. 89 (Porto Rico).

*Herodias egretta*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico); Journ. für Ornith., 1878, pp. 161, 187 (Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 355 (Porto Rico, very common).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 150 (specimen, Porto Rico).—Bowditch, Auk, 1902, p. 359 (common, Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 25-26 (Porto Rico, Piñero Island); Auk, 1916, p. 410 (Vieques, reported).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 48-49 (Cartagena Lagoon).

*Casmerodius egretta*, Struthers, Auk, 1923, p. 470 (Boquerón).

*Casmerodius alba*, Wetmore, Auk, 1925, p. 446 (bones from kitchen midden, St. Croix).

Found in small numbers in the coastal region of Porto Rico and reported from Vieques Island; seen on Piñero Island opposite Fajardo. During field work in 1912 birds were observed near Mameyes, February 9 to 29; on Piñero Island, off Fajardo, March 16; near Salinas, April 29 and May 2; Laguna de Guánica, May 26, and Cabo Rojo, August 26 and 30. Mr. F. A. Potts (in a letter dated August 5, 1923) reports seeing one in Guánica Bay. Danforth has recorded one from Cartagena Lagoon, and Struthers has found as many as ten at one time at Boquerón. I have identified remains of this species among bones from a kitchen midden on the Richmond estate near Christened, St. Croix, presented to the U. S. National Museum by Mrs. Hugo Hark. There is no modern record for the bird from this island.

In Comezon Cove, on the coast near Mameyes, I found, February 14, 1912, a nest in a clump of mangroves standing isolated in shallow water. The structure, a loosely made platform of sticks, held one young bird, apparently less than a week old, and two addled eggs. The young bird, a female, which was preserved as a specimen, is covered with long, straggling white down, elongated into a fuzzy crest on the crown. It exhibits the bare apterion on the back of the neck found in adult herons, and in addition has the foreneck, throat and face in front of the eyes entirely bare. An adult female with dorsal plumes fully developed was shot on February 14. There is also an immature bird in the U. S. National Museum, taken near Porto Real, January 27, 1899, by Dr. B. W. Evermann. Danforth says that the bird occurs regularly at Cartagena Lagoon, but is so shy that no hunter has ever succeeded in killing one. He saw it at Añasco, November 24, 1923; near Boquerón, March 8, 1924; near Cabo Rojo Light, April 26 and 27, 1924.

Gundlach recorded this species as very common, but since his day it has been sought for its plumes and now must be classed as rare.

The birds usually are shy and difficult to approach. They are seen ordinarily wading in search of food in shallow water or in flight at a distance. They come at times into wet lowland fields near the coast.

The species, pure white in all plumages, is distinguished from the snowy heron and the white phase of the little blue heron by its decidedly larger size.

### ***Egretta thula thula* (Molina)**

Snowy Heron, Garza Blanca

*Ardea Thula* Molina, Sagg. Stor. Nat. Chili, 1782, p. 235. (Chile.)

Snowy Heron, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

Snowy Egret, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez).

*Egretta?*, Newton, Ibis, 1859, p. 263 (St. Croix, reported).

*Garzetta candidissima*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico); Journ. für Ornith., 1878, pp. 161, 187 (Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 357 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 150 (Porto Rico).

*Ardea candidissima*, Cory, Auk, 1887, p. 324 (Antilles); Cat. West Indian Birds, 1892, p. 89 (Porto Rico).

*Egretta candidissima candidissima*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 25 (Porto Rico, Piñero Island).—Struthers, Auk, 1923, p. 470 (Boquerón).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 49-50 (Cartagena Lagoon).

*Egretta thula thula*, Wetmore, Auk, 1916, p. 410 (Vieques).

Resident on Porto Rico; seen on Piñero Island near Fajardo, and fairly common on Vieques; reported from St. Croix.

The snowy heron is found on Porto Rico among the lagoons in the coastal plain, in swampy areas near the mouths of rivers and about fresh-water lagoons. It is encountered usually near the coast, but after the breeding season wanders more or less casually inland to the foothills. On August 8, 1912, I saw one flying along the Río Viví near Utuado. The species was recorded as follows:—

Along the Guajataca River at Quebradillas, July 5, 1912; Bayamón, July 20 and 23; Río Piedras, December 22, 1911; Mameyes, February 9 to 29; Humacao, September 3 to 9; Salinas, April 26 to May 2; Laguna de Guánica, May 26; Cabo Rojo, August 24 to 31; Aguadilla, June 11; Piñero Island, near Fajardo, March 16, and Vieques Island, March 16 to April 3.

The hand of the plume-hunter has been raised so persistently against this beautiful heron that it has maintained itself successfully only in the more inaccessible swamps, while in recent years its retreats have been curtailed through the activities of woodchoppers and charcoal-burners. I was informed in 1912 that snowy herons nested on Piñero Island, opposite Fajardo, and on low, mangrove-covered islands offshore from Salinas. At the end of April little bands were observed flying between these islands and the mainland, lending credence to this statement.

The snowy herons fed with other species in shallow water over the bays and reefs at low tide, or at the borders of lagoons, where they waded at times in water nearly up to their bodies. They also came frequently into lowland cane-fields, especially when these had been recently plowed, and occasionally were seen searching for food in dry, upland pastures. Their sad experiences with man have made them wary and suspicious and, when found with other species, the snowy herons are usually the first to take alarm. Danforth reports that the species seems to be increasing slightly in numbers—a matter for gratification, as it is an interesting and beautiful bird.

The species is marked by its pure white plumage and black legs.

The food consists of small fishes, aquatic insects, lizards, amphibians and crustaceans. It is probable that birds come to cultivated fields and pastures to search for the changa, or mole cricket, and other Orthoptera.

#### ***Hydranassa tricolor ruficollis* (Gosse)**

Louisiana Heron, Garza, Garza de Cuello Rojo, Garza de Vientre Blanca

*Egretta ruficollis* Gosse, Birds Jamaica, 1847, p. 338. (Jamaica.)

Louisiana Heron, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Demiegretta ruficollis*, Gundlach, Journ. für Ornith., 1874, p. 313 (recorded by Dr. Bello); Journ. für Ornith., 1878, pp. 161, 187 (Boquerón); Anales

Soc. Esp. Hist. Nat., 1878, p. 356 (Boquerón).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 150 (Porto Rico).

*Ardea tricolor ruficollis*, Cory, Auk, 1887, p. 327 (Greater Antilles); Cat. West Indian Birds, 1892, p. 89 (Porto Rico).

*Hydranassa tricolor ruficollis*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 24-25 (near Salinas and Guayama).—Struthers, Auk, 1923, p. 470 (Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 50-51 (Cartagena and Anegado lagoons, near Mayagüez, Boquerón).

This heron is only fairly common in the bays and lagoons of the coastal region of Porto Rico. Gundlach found it very common at Boquerón, but did not record it elsewhere. On May 3, 1912, I shot an adult male at La Playita, near Salinas, and recorded several others. Struthers saw the species occasionally at the borders of mangroves, swamps and lagoons in western Porto Rico, but does not cite definite localities. Danforth found it in small numbers at Cartagena Lagoon, where he recorded young not quite grown on October 7, 1924. He found the species also at Anegado Lagoon, Caño Corazón, near Mayagüez, and at Boquerón.

This heron is about as large as the little blue heron, but is more slender, with longer neck and bill. It is distinguished by the pure white breast and abdomen, in contrast to the bluish-gray back and neck. A tuft of head plumes is mixed white and dark chestnut and the foreneck is mottled with white and dark reddish brown. The immature bird has the head and neck light brown.

The specimen that I secured was a breeding individual. Its stomach contained a goby and several killifishes.

#### **Florida caerulea caeruleascens (Latham)**

Little Blue Heron, Garza azul, Garza, Garza Pinta, Garza Blanca

*Ardea caeruleascens* Latham, Index Orn., 1790, Vol. II, p. 690 (Cayenne.)

Little Blue Heron, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez); Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Ardea caeruleascens*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208 (Porto Rico).

*Ardea caerulea* West, Beytr. Besch. St. Croix, 1794, p. 243 (St. Croix).—Moritz, Wieg. Arch. Naturg., 1836, p. 377 (Porto Rico).—Taylor, Ibis, 1864, p. 171 (Porto Rico).—Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico).—Cory, Auk, 1887, p. 325; Auk, 1890, p. 374 (Tortola); Cat. West Indian Birds, 1892, p. 90 (Porto Rico, Tortola).

*Florida caerulea*, Gundlach, Journ. für Ornith., 1874, p. 313, (Porto Rico); Journ. für Ornith., pp. 161, 187 (Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 357 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 150 (Porto Rico).—Bowditch, Oölogist, 1900, p. 72 (Vieques); Auk, 1902, p.



359 (Porto Rico).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 647 (St. Croix).—Todd, Ann. Carnegie Mus., 1916, Vol. X, p. 180.

*Florida caerulea caerulescens*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 23-24 (Porto Rico, Vieques, Culebra); Auk, 1916, p. 410 (Vieques); Auk, 1917, p. 57 (Culebra).—Struthers, Auk, 1923, p. 470 (Boquerón, Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 51-52 (Cartagena Lagoon, habits).

Common in Porto Rico. Recorded also from Vieques, Culebra, St. Croix and Tortola, and unquestionably occurs elsewhere.

Riley (Smiths. Misc. Coll., November 9, 1904, Vol. XLVII, p. 279) has separated the little blue heron of the West Indies from that of North America on the basis of duller coloration. Todd (Ann. Carnegie Mus., 1916, Vol. X, pp. 179-180) recently has considered the two identical, but in this, I believe, is in error. In this connection I have examined a large series from the islands between Cuba and Grenada, for purposes of comparison with birds from the southeastern United States, and find that those from the West Indies unquestionably average duller and darker, both above and below, than skins from Florida and South Carolina. In comparing these birds it must be recognized that fatty oils, when present on the feathers, darken their coloration perceptibly, so that examination of clean skins must be made. In such the distinction is easily perceptible. The West Indian bird will thus continue as *Florida c. caerulescens*, while that of the United States will be known as *F. c. caerulea*. Material from Mexico and Central America has not been considered in this connection.

On Porto Rico the little blue heron was common near the coast in the vicinity of marshes and lagoons. It was not observed beyond the confines of the coastal plain and in 1912 was more abundant near Mameyes, Yabucoa and Guánica than elsewhere. It was the most common heron on Vieques, and a few individuals were recorded on Culebra. The species was found at the following localities:—

Along the Rio Guajataca near Quebradillas, July 5, 1915; at Bayamón, July 20 to 25; Mameyes, February 9 to 29; Humacao, September 3 to 9; Yabucoa, May 3 to 10; Salinas, April 26 to May 2; Juana Diaz, August 17 to 22; Laguna de Guánica, May 26; Cabo Rojo, August 24 to 31; Añasco, June 7 to 12; Vieques Island, March 16 to April 3, and Culebra Island, April 5 to 21.

Gundlach found the little blue heron nesting from May to July, but modern dates differ, since I noted, February 9, near Mameyes nests that had apparently been built recently, and killed a breeding male on Vieques, March 29. A colony of one hundred fifty pairs was found

near Yabucoa, May 8. The nests are loose structures of twigs placed in trees from twenty to thirty feet from the ground. When disturbed in this rookery, the birds circled in great confusion overhead, emitting harsh squawks, or settled on commanding dead limbs, where they might view the intruder.

In many regions herons were hunted as game, which rendered them wild, and in such cases it was difficult to approach them. Where undisturbed, they were, however, tame. Many were observed feeding on tidal flats when the water was low, retreating to the shelter of mangroves later. Others fed in cane-fields, where the growth was small, and occasionally they fed in dry pastures. From breeding colonies at times they traveled several miles to feed, and on many occasions were found in small flocks. After the nesting season they are more widespread in their distribution and pass inland to the edge of the foothills or occasionally, where the valleys are broad, wander back among the hills, as in August I saw individuals on the Guanajibos River below San Germán. At Cartagena Lagoon Danforth found young in white plumage appearing in August and becoming abundant in September.

This species, like the green heron, eats the changa, or mole cricket, as well as other Orthoptera, crustaceans, lizards, fishes and miscellaneous insects.

Cory reports it from Tortola, and Hans West, in 1794, records it from St. Croix. Mortensen also reports it from the latter island.

The plumage of the adult is bluish gray, with a wash of warm brown on head and neck. Some of the young are dull slaty gray and others are white, in which condition they may be distinguished from the snowy heron, of similar size, by the greenish tarsi and feet and by a wash of gray concealed on the tips of the primaries. Some young are curiously pied with light and dark.

***Butorides virescens virescens* (Linnaeus)**

Little Green Heron

*Ardea virescens* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 144. (Coast of South Carolina.)

*Butorides virescens virescens*, Oberholser, Proc. U. S. Nat. Mus., 1912, Vol. 42, pp. 535, 537, 539 (Fajardo, Porto Rico, accidental).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 21 (listed).

An adult male, taken at Fajardo, Porto Rico, February 16, 1899, has the following measurements: wing, 180 mm.; tail, 67 mm.; exposed culmen, 60.7 mm.; tarsus, 48.0 mm. This bird is somewhat larger than any other noted in Porto Rico and has been regarded as an accidental

visitor from North America. It is so included here, with the observation that a slight average difference in size is the main character to support separation of a West Indian form of the little green heron.

As at present accepted, the bird here under discussion represents the only record for the West Indies of the North American bird, which is supposed, however, to range in migration to Bermuda, where it is not at present known to breed.

***Butorides virescens maculatus* (Boddaert)**

West Indian Green Heron, Green Gaulin, Garling, Martinete, Martín Pescador

*Cancroma maculata* Boddaert, Tabl. Planch. Enl., 1783, p. 54. (Martinique, Lesser Antilles.)

Cuban Green Heron, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez); Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Ardea ludoviciana*, Ledru, Voy. Iles Ténériffe, La Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208.

*Ardea (Cancrophagus) viridis*, Moritz, Wiegman. Arch. Naturg., 1836, p. 377 (Porto Rico).

*Ardea viridis*, Knox, Hist. Acc. St. Thomas, W. I., 1852, p. 221 (St. Thomas).

*Ardea virescens*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico).—Cory, Auk, 1887, p. 326 (Antilles); Auk, 1890, pp. 374, 375 (Anegada, Tortola, Virgin Gorda); Auk, 1891, p. 47 (St. Croix); Cat. West Indian Birds, 1892, pp. 90, 137 (Porto Rico, St. Croix, Virgin Gorda, Tortola).—Bowditch, Oölogist, 1900, p. 72 (Vieques).

*Ocniscus virescens*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico); Journ. für Ornith., 1878, pp. 161, 187 (Porto Rico); Anales Soc. Esp. Hist. Nat. 1878, p. 359 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 150 (Porto Rico).

*Butorides virescens*, Newton, Ibis, 1859, pp. 261-262 (St. Croix, breeding).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas).—Taylor, Ibis, 1864, p. 171 (Porto Rico).—Bowditch, Auk, 1902, p. 359 (Porto Rico).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 647 (St. Croix).

*Butorides virescens cubanus*, Oberholser, Proc. U. S. Nat. Mus., 1912, Vol. 42, pp. 558-561 (Porto Rico: Hucares, San Juan, Mayagüez, Arecibo, Caguas, Rio Piedras, Mameyes; Vieques, St. Thomas, St. Croix, St. John, Tortola, Anegada).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 21-23. Pls. 3 and 4 (Porto Rico, coastal plain in general, Vieques and Culebra); Auk, 1916, p. 410 (Vieques); Auk, 1917, p. 57 (Culebra).—Struthers, Auk, 1923, p. 470 (Guánica Lagoon, Porto Rico, nesting).

*Butorides virescens maculatus*, Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 52-54, Figs. 26-27 (Cartagena Lagoon).

Common on Porto Rico; recorded from Vieques, Culebra, St. Croix, St. Thomas, Anegada, Tortola, St. John and Virgin Gorda. Supposed

to be resident everywhere, and actually recorded breeding on Porto Rico, Vieques and St. Croix.

On Porto Rico the green heron (Pl. LXI) is distributed all through the coastal plain and is one of the most common of birds. During the course of my own field work it was noted in the following localities:—

Quebradillas, July 2 to 6, 1912; Manatí, July 7 to 11; Río Piedras, December 16, 1911, to January 4, 1912; Mameyes, February 9 to 29; Humacao, September 3 to 9; Maunabo, May 11; Salinas, April 26 to May 2; Juana Diaz, August 17 to 22; Yauco, May 16 to 28; Cabo Rojo, August 24 to 31; Mayagüez, June 6; Aguadilla, June 9 to 12; Maricao, June 3; Lares, June 18 to July 1; Utuado, August 3 to 9; Adjuntas, August 10 to 16; Ciales, July 12 to 18; Aibonito, January 26 to February 5; Caguas, January 5 to 14; Vieques Island, March 16 to April 3, and Culebra Island, April 5 to 21.

Inland through the foothills green herons range along streams, being abundant to about 500 feet altitude (Caguas, Comerio, Ciales and Utuado). Above this they occur in small numbers but irregularly, being noted below Hacienda Catalina (on El Yunque), at Cayey, Aibonito (1900 feet), above Adjuntas (2000 feet) and near Lares and Maricao. Few of those found in the higher country appeared to be breeding birds, and after the breeding season individuals seem to wander inland from the coastal plain.

The irrigated lands of the south coast are peculiarly adapted to the needs of the martinete, and here it was found in numbers along ditches and channels through the fields. Near Yabucoa these birds were most abundant, and there on May 8 I estimated the number seen in the course of a forenoon as between 1500 and 2000 individuals. In dry regions, as near Quebradillas and many areas on the south side of Porto Rico, they were found mainly at the borders of streams, but occasionally searched for food in dry upland pastures.

On Vieques Island the species was fairly common about lagoons and on Culebra a few were noted in mangroves bordering the bay known as Ensenada Honda, and at Flamenco Lagoon.

The question of subspecies in the green heron has been discussed exhaustively by Oberholser (Proc. U. S. Nat. Mus., 1912, Vol. 42, pp. 529-577), with recognition of a subspecies *cubanus* from the Greater Antilles and a number of additional forms from the Lesser Antilles. With twenty skins, taken personally, available from Porto Rico, Vieques and Culebra, I have made critical comparison to determine their sub-specific status. In color the series from Porto Rico is closely similar to skins from the eastern United States, but the Porto Rican birds are,

on the average, slightly smaller in size. (Wing measurement in ten males, 163.0 to 170.5 mm.; average, 166.9 mm.; in ten females, 158.5 to 175.0 mm.; average, 169.6 mm.)

Survey of the data offered by Oberholser fails to indicate, in my opinion, adequate grounds for segregation of birds from the Antilles into a number of races. The form from the Greater Antilles recorded formerly as *Butorides virescens cubanus* is here considered to range throughout the Antillean region and must, therefore, bear the older name, *Butorides virescens maculatus*.

The green heron may nest singly or in scattered colonies. A laying female was taken on Vieques Island May 27, 1912, and a male in breeding condition was shot on Culebra April 13. Breeding females were secured at Yabucoa on May 4. At this place, too, many occupied nests were observed. Nesting sites were chosen occasionally in clumps of bamboo but more often in mangroves and similar growth near the lagoons. Struthers has recorded, April 2, 1921, nests built among reeds at Guánica Lagoon—an unusual site for this species, which normally nests in trees, and due possibly to destruction of tree growth in its usual haunts. The nests are simple structures of twigs laid carelessly together. On May 8, 1912, near Yabucoa, I collected a set of three fresh eggs from a nest fifteen feet above the ground, in a thick tree at the border of a lagoon. Danforth states that the main breeding season is in April and May, but records one nest on November 30, 1923. He reports nests in bamboo and in coconut palms.

Green herons are nearly always tame, unsuspicious birds that seldom fly until closely approached, except in regions where they are much hunted. When flushed, they rise with a series of squawking notes, but before going far alight on the ground, on a fence post or the limb of a tree. Sometimes they endeavor to escape notice by drawing the body up, pointing the bill straight in the air and presenting the striped breast to the observer. In feeding they follow slowly along the borders of marshes and lagoons, seldom wading in the deeper water as the larger, longer-legged herons do, or walk along rows of cane in the cultivated fields. Open pastures are also favorite haunts. Here they work through the short grass, preferring the damper areas, but not neglecting those that are high and dry. Unless very hungry, they are rather slow and sluggish and may spend an hour or more standing wooden-like with the neck drawn in on the shoulders. Where the slopes along streams are steep and abrupt, as at Comerio, the birds do not go far into the fields, remaining close to the water. In more level localities they wander a great deal.

The ordinary note is a harsh squawk, though frequently they give a clucking note, especially after alighting from flight. A note of anger may be represented by *Kek kek chuck chuck*. A gunshot along a stream where they are common always calls forth a series of protesting squawks from birds hidden in clumps of bamboos or other tree growths at the edge of the water. At the end of the breeding season young birds are abundant and are harried and pursued continually by the adults, who fly after them in the air and run at them on the ground with open mouths, so that only in the bushes are they safe from attack.

From field observations it appeared that the breeding season may extend from February 1 to the end of May. The young are well grown by July 1.

The martinete is one of the greatest enemies of the destructive mole cricket, or changa, as I found that this creature formed slightly more than one-half of the heron's food. The bird also consumes other Orthoptera, small fishes, crustaceans and amphibians. It has been hunted as a game bird in the past, but should be carefully protected as a valuable ally of agriculture. Its presence may be encouraged by leaving areas of thicket cover about lagoons, streams and ditches. Since the recent introduction of bamboo, the martinete has taken kindly to this cover. It uses the dense clumps as resorts during the heat of the day and even nests in them.

The green heron exceeds the least bittern in size, but is smaller than any of the other herons of the region in question, as it is only sixteen to seventeen inches in length. In the adult the crown is greenish black, the back dark green, more or less washed with gray. The throat and foreneck are buffy white, on the latter more or less mixed with black, with the rest of the underparts dark gray. The neck, except in front, is deep rufous chestnut. Immature birds are streaked with blackish below and are less deeply colored above.

### ***Nycticorax nycticorax naevius* (Boddaert)**

Black-crowned Night Heron, Yaboa, Yaboa Real

*Ardea naevia* Boddaert, Tabl. Planch. Enl., 1783, p. 56. (Cayenne.)

Black-crowned Night Heron, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon, December 22, 1923).

*Ardea nycticorax*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (one specimen, Porto Rico).

*Nyctiardea gardeni*, Gundlach, Journ. für Ornith., 1874, p. 313 (seen in collection of Hjalmarson at Arecibo); Journ. für Ornith., 1878, pp. 161, 187 (specimen taken, Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 362

(Porto Rico, not rare).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 150 (four specimens, Porto Rico).

*Nycticorax nycticorax naevius*, Cory, Auk, 1888, p. 49 (Porto Rico); Cat. West Indian Birds, 1892, p. 90 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 21 (Porto Rico).—Struthers, Auk, 1923, p. 470 (Mayagüez and Anegado Lagoon, Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 54 (Cartagena Lagoon, specimen).

The present species, it is said, was at one time fairly common in Porto Rico, and specimens are recorded from the collections of Hjalmarson at Arecibo and Stahl at Bayamón (five specimens catalogued). Gundlach saw it in Hjalmarson's possession, and later collected it personally. I did not find it but it has been recorded recently by Struthers, who saw six birds near Mayagüez, October 29, 1921, and noted others at Anegado Lagoon, near La Plata. Danforth has recorded one, April 8, 1922, at Cartagena Lagoon, and noted it as fairly common in 1923 and 1924. He collected one on June 28, 1924.

I have examined no specimens from Porto Rico. The immature bird of the present species is browner than the yellow-crowned night heron. The adult is nearly white below, gray on wings, tail and neck, with the back and crown dull black with greenish sheen. Long plumes springing from the back of the head are white. The eye of the adult is colored a deep red.

The black-crowned night heron deserves its name, in that it pursues its vocation of fisherman in the main by night, when its passage through the air to its fishing grounds, though concealed from ordinary view, is heralded by loud squawking calls. During the day it frequents dense tree growths in the fastnesses of swamps.

### ***Nyctanassa violacea violacea* (Linnaeus)**

Yellow-crowned Night Heron, Yaboa, Yaboa Real, Guanaba

*Ardea violacea* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 143. (Carolina.)

*Ardea violacea*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (Porto Rico).

*Nyctherodias violaceus*, Newton, Ibis, 1859, pp. 262-263 (St. Croix).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 379 (St. Thomas).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 187; Anales Soc. Esp. Hist. Nat., 1878, p. 363 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 150 (Porto Rico).—Mortensen, Atlanten, 1900, Vol. VI, No. 66, p. 647 (St. Croix).

*Nycticorax violaceus*, Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Cory, Auk, 1888, p. 48 (Porto Rico, St. Thomas, St. Croix); Auk, 1890, p. 375 (Virgin Gorda); Auk, 1891, p. 47 (St. Croix); Cat. West Indian Birds, 1892, p. 90 (Porto Rico, St. Thomas, Virgin Gorda, St. Croix).

*Nyctanassa violacea*, Bowdish, Auk, 1902, p. 359 (Porto Rico, Mona).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 20 (Porto Rico, Mona); Auk, 1916, p. 409 (Vieques); Proc. U. S. Nat. Mus., 1918, Vol. 54, pp. 515, 520 (bones from middens, St. Thomas, St. Croix).—Struthers, Auk, 1923, p. 470 (Porto Rico).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 54 (Cartagena Lagoon).

Formerly common in coastal mangrove swamps and lagoons of Porto Rico, now reduced in numbers; recorded recently from Mameyes, Humacao and Salinas (Wetmore), and vicinity of Guánica (Struthers); a few in swamps at Manuel Quí and elsewhere in Vieques. Recorded by Bowdish as common on Mona Island, and found on St. Thomas, St. Croix and Virgin Gorda.

Bangs and Penard (Bull. Mus. Comp. Zoöl., April, 1918, Vol. LXII, p. 31) have separated the yellow-crowned night heron from Surinam as *Nyctanassa v. cayennensis* (Gmelin) on the basis of darker color and smaller size (wing in adult 252, tarsus 78, exposed culmen 78, one specimen), and have also designated the bird from the West Indies as *Nyctanassa violacea jamaicensis* (Gmelin), as they consider it separable from the typical form of North America by paler general coloration, with the gray edgings of the dorsal feathers lighter.

In a considerable series of the yellow-crowned night heron in the U. S. National Museum there are no pertinent specimens from South America. The measurements given for the single adult from Surinam are slightly less than those of other birds that I have handled, so that, without examination, *cayennensis* is held valid. It may be noted, however, that Todd (Ann. Carnegie Mus., 1922, Vol. XIV, p. 138) finds that skins from the Santa Marta region of Colombia are similar to those from North America.

After careful comparison of a good series, including adults from Andros Island, Cuba, Jamaica, Santo Domingo and Porto Rico, I can find no distinguishing characters of color or size to separate these from birds obtained from various localities in southeastern United States. There is considerable variation in depth of coloration in this species throughout its range, but this seems wholly individual. Adult males show the following measurements:

West Indies (Greater and Lesser Antilles), wing, 275–290 mm.; tarsus, 84.5–100 mm.

United States (Florida to Texas), wing, 275–300 mm.; tarsus, 94.0–101.4 mm.

The mainland bird may average very slightly larger, but the difference is so small as to be intangible.



Four adults from St. Eustatius, Barbuda, Grenada and Guadeloupe have the dark median lines on the dorsal feathers narrower than in the average specimens from other parts. With more material it is possible that a Lesser Antillean form may emerge, but it must be recorded that the skins in question are equaled in this character by an adult from the Tres Marias Island, off the western coast of Mexico. Other skins from Mexico and Central America to Darien are like those from North America. It appears to me certain that the yellow-crowned night heron from the Greater Antilles is identical with that of the North American continent, and it is so listed here.

The present species frequents mangroves and swampy forests, where it remains rather quiet during the day, becoming more active at nightfall. At Mameyes I flushed one from the top of a coconut palm, at Salinas birds were seen in mangrove swamps, and near Humacao I flushed a young bird from a ditch in a cane-field. On Vieques Island a few were seen in thick trees at the border of a dry lagoon. Struthers in 1923 recorded them from the lagoons of Guánica Valley and the coastal mangrove swamps, and Bowdish in August, 1901, found them common on Mona Island. In the Museum of Comparative Zoölogy there is a female from Bayamón, taken by Dr. Stahl. Bones were found in the kitchen middens of St. Thomas and St. Croix.

As late as the opening of the present century Bowdish recorded the yaboa as common, and its lessened numbers in recent years may be attributed to the fact that it is hunted as a game bird and to the cutting away of the cover of its native haunt.

The immature birds are grayer than the same stage in the black-crowned night heron and are also distinguished by their heavier bills. The adult in general is gray, strongly streaked with black on back and wings, with the head black except for the cheeks, crown and long slender nuchal plumes, which are white.

#### Subfamily BOTAURINAE

#### ***Botaurus lentiginosus* (Montagu)**

#### American Bittern, Yaboa

*Ardea lentiginosa* Montagu, Suppl. Orn. Dict., 1813, text and plate. (Piddletton, Dorsetshire, England.)

*Botaurus lentiginosus*, Gundlach, Journ. für Ornith., 1874, p. 313 (noted a specimen in collection of Blanco); Journ. für Ornith., 1878, pp. 161, 187 (Laguna de Guánica); Anales Soc. Esp. Hist. Nat., 1878, p. 361 (Laguna de Guánica, November, 1873).—Stahl. Faun. Puerto Rico, 1883, p. 65 (cited from Gundlach).—Cory, Auk, 1888, p. 49 (Porto Rico, accidental): Cat. West Indian Birds 1892, p. 89 (Porto Rico).—Wetmore, U. S. Dept.

Agric. Bull. 326, 1916, p. 27 (records cited).—Struthers, Auk, 1923, p. 471 (one taken, Boquerón, September 23, 1921).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 46 (Cartagena Lagoon, seen).

Migrant straggler to Porto Rico, for it appears from published accounts that there are four definite records. Gundlach found it at the Laguna de Guánica in November, 1873, and, though he does not definitely say so, leads us to infer that he secured a specimen. He also records a skin in the collection of Blanco. More recently Struthers shot one, September 23, 1921, in a mangrove thicket south of Boquerón. Danforth saw one at Cartagena Lagoon on November 30, 1923.

The American bittern is somewhat larger than the night herons and is distinguished by its very buffy brown coloration, with a glossy black streak on either side of the neck and a plain brown crown.

***Ixobrychus exilis exilis* (Gmelin)**

Least Bittern, Martinete Chico, Martinete

*Ardea exilis* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 645. (Jamaica.)

*Ardea exilis*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.—Akad. Förh., 1869, p. 602 (Porto Rico).

*Ardetta exilis*, Gundlach, Journ. für Ornith., 1874, p. 313 (taken by Hjalmarson); Journ. für Ornith., 1878, pp. 161, 187 (specimens, Mayagüez, Arecibo; nesting, Río Toa near Dorado); Anales Soc. Esp. Hist. Nat., 1878, p. 360 (fairly common, nest and three eggs, Arecibo, May 7).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 150 (specimens).—Cory, Auk, 1888, p. 50 (Porto Rico); Cat. West Indian Birds, 1892, p. 89 (Porto Rico).

*Ixobrychus exilis exilis*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 26-27.—Struthers, Auk, 1923, p. 471 (common Anegado and Guánica lagoons; eggs taken, Guánica, April 2, 1921).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 47 (Cartagena Lagoon).

Porto Rico: locally fairly common in fresh-water marshes. Recorded at Anegado, Cartagena and Guánica lagoons, near Mayagüez, Arecibo and the Río Toa near Dorado. There are two skins, taken by Dr. A. Stahl, in the Museum of Comparative Zoölogy that are marked Bayamón, and there is a specimen in the U. S. National Museum secured at Porto Real on January 27, 1889. Mr. F. A. Potts (in litt. May 15, 1921) found the least bittern fairly common near Aguirre, and recorded it at a reservoir three miles west of Guayama, April 22, 1921. Danforth found it fairly common at Cartagena Lagoon.

The least bittern prefers for its habitat fresh-water marshes. There it is found usually amid rushes and grass growing in one or two feet of water. At the approach of an intruder it sometimes remains motionless,

with bill pointed straight in the air. Its appearance at such times is so unbirdlike that it may be overlooked. At other times it is extremely wild and rises in flight at a considerable distance. The bird flushes with dangling legs and outstretched neck, but at once the feet are extended straight behind, the neck is folded, and the bird flies rather swiftly away over the marsh vegetation to drop into securer cover. When not alarmed, it rests quietly in the rushes or clambers about with extraordinarily long strides, grasping the vertical plant stems with its long, slender toes. On May 26, 1912, I found least bitterns fairly common at the Laguna de Guánica and collected three. One was flushed, December 22, 1911, in a mangrove swamp on the coast below Río Piedras and was shot, but fell where it could not be retrieved. The unusual environment suggests that this bird may have been a migrant.

The food of this species is made up of small fishes, amphibians and occasionally insects.

Gundlach secured three eggs from a nest at Arecibo on May 7, and Struthers found eggs at Guánica on April 2, 1921. F. A. Potts writes me that he noted a young bird covered with pin feathers in a nest at a reservoir near Guayama on April 22, 1921. Danforth reports nests from Cartagena Lagoon, April 11 and May 9, 1924. These contained from two to three pale bluish-white eggs. Two collected on May 9 measured 1.30 x 0.95 inches (33 x 24 mm.). The nest is a slight cradle of reed stems placed in a clump of rushes.

The least bittern of the West Indies appears slightly smaller than that from eastern United States and may prove to be a distinct form. In three males the wing measures 101.7, 106.6 and 108.0 mm., while in four females it is 100.4, 109.3, 110.5 and 112.2 mm. respectively.

The species in Porto Rico is easily distinguished as the smallest of the herons, marked by buffy underparts, which in females and young are more or less streaked. In the adult male the crown and back are greenish black, while in females and young these areas are rich brown.

#### Suborder CICONIAE

#### Superfamily THRESKIORNITHIDES

#### Family THRESKIORNITHIDAE

#### Subfamily THRESKIORNITHINAE

#### [*Plegadis falcinellus falcinellus* (Linnaeus)]

Glossy Ibis, Coco, Coco Oscuro, Coco Prieto

*Tantalus falcinellus* Linnaeus, Syst. Nat., ed. 12, 1866, Pt. 1, p. 241. (Austria-Italy.)

*Ibis falcinellus*, Bello, Zoöl. Gart., 1871, p. 350 (Porto Rico).

*Falcinellus ordii*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 187; Anales Soc. Esp. Hist. Nat., 1878, p. 366 (pictured by Bello).—Stahl, Faun. Puerto Rico, 1883, p. 64 (listed).  
*Plegadis autumnalis*, Cory, Auk, 1887, p. 321 (Greater Antilles); Cat. West Indian Birds, 1892, p. 88 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 27 (hypothetical).

The first notice of this species for Porto Rico is that of Bello, who cites it in a list without comment.

Gundlach included it in his various papers, as he found it pictured in the drawings of birds made by Dr. Bello, of Mayagüez. No specimens have been recorded and the species is of doubtful occurrence.]

### **Guara alba** (Linnaeus)

White Ibis, Coco Blanco

*Scolopax alba* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 145. (Carolina.)  
*Eudocimus albus*, Gundlach, Journ. für Ornith., 1874, p. 313 (reported); Journ. für Ornith., 1878, pp. 161, 187 (reported, east coast); Anales Soc. Esp. Hist. Nat., 1878, p. 364 (reported, northeast coast).—Stahl, Faun. Puerto Rico, 1883, p. 64, (listed); Ornith., 1887, p. 452 (rare).  
*Guara alba*, Cory, Auk, 1887, p. 321 (Greater Antilles); Cat. West Indian Birds, 1892, p. 88 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 27 (specimen in Stahl collection).

Accidental in Porto Rico.

Dr. Richmond in 1900 found a mounted specimen of the white ibis in the Stahl collection in San Juan—the only definite basis for the inclusion of the species in the avifauna of Porto Rico. The species was reported to Gundlach, but he did not see it personally.

## Suborder PHOENICOPTERI

### Family PHOENICOPTERIDAE

#### **Phoenicopus ruber** Linnaeus

Flamingo, Flamenco

*Phoenicopus ruber* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 139. (Jamaica, Cuba and Bahamas.)  
 Flamingo, West, Beytr. Besch. St. Croix, 1794, p. 269 (Vieques).  
*Phoenicopus ruber*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 209, (Rfo Loisa, Porto Rico).—Newton, Ibis, 1859, pp. 365-366 (reported, St. Croix; mention of "Flamingo-pan Bay," St. Thomas).—Bello, Zool. Gart., 1871, p. 350 (listed).—Gundlach, Journ. für Ornith., 1874, p. 314 (recorded); Journ. für Ornith., 1878, pp. 162, 190 (found at Boquerón and south coast, reported on east coast); Anales Soc. Esp. Hist. Nat., 1878, p. 398 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, p. 65 (listed).—Cory, Cat. West Indian Birds,

1892, p. 88 (Porto Rico).—Bowditch, Auk, 1902, p. 359 (reported, Cabo Rojo).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 647 (St. Thomas, specimen).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 27-28; Auk, 1916, p. 410 (Vieques, reported uncertainly); Auk, 1917, p. 57 (reported, Culebra).

Formerly found on the south coast of Porto Rico (Boquerón); reported as of former occurrence on Vieques, Culebra, St. Croix and St. Thomas.

Gundlach records the flamingo at Boquerón, and heard rumor of its presence elsewhere on the south coast and to the eastward in Porto Rico. Ledru states that birds were found near Río Loisa. Hans West in 1794 writes admiringly of their plumage as seen on Vieques and in 1912 I heard rumor of their occurrence there. Formerly, it is said, the flamingo ranged to Culebra, where a large lagoon today is known as Flamenco. The Newtons heard of the bird on St. Croix, and call attention to the name "Flamingo-pan Bay" on St. Thomas as further indication of its presence. There seems to be no mention of specimens unless Gundlach secured some, which is not certain. Mortensen reports a specimen in the Zoölogical Museum at Copenhagen, taken on St. Thomas in 1852, and heard of the species on Anegada.

## Order ANSERIFORMES

### Suborder ANSERES

#### Family ANATIDAE

#### [Subfamily ANSERINAE]

#### [*Chen atlantica* Kennard

Greater Snow Goose, Ganso Blanco, Guanana

*Chen atlantica* Kennard, Proc. New England Zool. Club, Vol. IX, February 16, 1927, p. 93. (Princess Anne County, Virginia.)

*Chen hyperboreus*, Gundlach, Journ. für Ornith., 1874, p. 314 (reported); Journ. für Ornith., 1878, pp. 162, 190 (reported from Isabella); Anal. Soc. Esp. Hist. Nat., 1878, p. 399 (reported by various persons).—Stahl, Faun. Puerto Rico, 1883, p. 65 (listed).—Cory, Auk, 1888, p. 58 (Porto Rico).

*Chen hyperboreus nivalis*, Cory, Cat. West Indian Birds, 1892, p. 87 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 30 (hypothetical).

Perhaps a rare winter visitant in Porto Rico. Several reports of wild white geese came to Gundlach's attention, and I was told such birds came at times to the lagoons at Manatí. No specimens have been preserved and the species is here cited as of uncertain status.]

## Subfamily DENDROCYGNINAE

**Dendrocygna arborea** (Linnaeus)

West Indian Tree-Duck, Black-bellied Tree-Duck, Yaguasa, Chiriría

*Anas arborea* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 128. (America.)

Black-bellied Tree-Duck, Danforth, Bird-Lore, 1924, p. 52 (two, Cartagena Lagoon, December 22, 1923).

*Dendrocygna autumnalis*, Taylor, Ibis, 1864, p. 172 (Porto Rico, abundant).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916 p. 30 (error for *D. arborea*).—Struthers, Auk, 1923, p. 471 (Anegado Lagoon, nesting; Cabo Rojo).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 45-46 (Cartagena Lagoon).

*Anas arborea*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 209 (listed).—Bello, Zool. Gart., 1871, p. 550 (listed).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (nesting, Porto Rico).

*Dendrocygna arborea*, Newton, Ibis, 1859, p. 366 (St. Croix, fairly common, specimens).—Gundlach, Journ. für Ornith., 1874, p. 314 (specimens); Journ. für Ornith., 1878, pp. 162, 190 (Mayagüez, Arecibo, Guánica).—Anales Soc. Esp. Hist. Nat., 1878, p. 400 (common resident, Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 154 (2 specimens); Ornis, 1887, p. 453 (resident, Porto Rico).—Cory, Cat. West Indian Birds, 1892, p. 87 (Porto Rico, Virgin Gorda).—Salvadori, Cat. Birds Brit. Mus., 1895, Vol. XXVII, p. 164 (Virgin Gorda, specimen).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 647 (St. Croix).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 303 (bones from caves, Utuado and Morovís).—Phillips, Nat. Hist. Ducks, 1922, Vol. I, p. 169 (Porto Rico, Virgin Gorda, St. Croix).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 46 (Cartagena Lagoon).

Lowland regions of Porto Rico, where it was formerly common; now locally fairly common; recorded from St. Croix and Virgin Gorda. Gundlach found this duck very common, and mentions especially that he saw it near Mayagüez, Arecibo and the Laguna de Guánica. During my work on the island I did not succeed in locating it, though it was reported to be in the mangrove swamps near Mameyes. Struthers has been more fortunate, as he noted four at Anegado Lagoon on December 3, 1921, and took two eggs and two nestlings from a hollow in a dead tree at this point on December 18, 1922. He also saw six that were held as captive birds near Cabo Rojo. Danforth found the tree-duck fairly common at Cartagena Lagoon, where it came to feed regularly at night, according to native reports, at times in flocks containing from twenty-five to one hundred birds, and was occasionally flushed in the marshes during the day. He was told that a second species occurred rarely, but this must be considered doubtful until substantiated by specimens. The

only other tree-duck recorded from the West Indies is the white-faced species (*Dendrocygna viduata*), which has been recorded casually from Cuba. I have identified bones of this species from cavern deposits near Utuado and Morovís.

The Newtons said the species was in their day fairly common on St. Croix, and record a male taken July 21 and a female September 17, 1858. There are no other known records for the island. Cory lists the species for Virgin Gorda without comment, probably quoting Salvadori, who noted in the British Museum a juvenile specimen from Virgin Gorda taken by Cyrus Winch.

This duck inhabits forested swamps and at times is found in mangroves. It is reported as inactive during the day, but flies at dusk, when it attracts attention by its shrill whistling calls. It is said to feed regularly on the fruit of the royal palm.

The species is distinguished by its habit of alighting in trees, by its long neck and legs and dark-brown plumage, with whitish lower breast and abdomen heavily spotted and barred with black.

#### Subfamily ANATINAE

#### *Mareca americana* (Gmelin)

Baldpate, American Wigeon, Pato Lablanco

*Anas americana* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 526. (Louisiana and New York.)

*Anas americana*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Ricco, 1810, Vol. II, p. 209 (listed).—Hartlaub, Isis, 1847, p. 611 (listed).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (young male taken by Hjalmarson).—Cory, Cat. West Indian Birds, 1892, p. 86 (Porto Rico, St. Thomas).

*Mareca americana*, Newton, Ibis, 1860, p. 308 (taken by Riise, St. Thomas).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190; Anales Soc. Esp. Hist. Nat., 1878, p. 402 (specimen, taken by Hjalmarson).—Stahl, Faun. Puerto Rico, 1883, p. 65 (listed).—Cory, Auk, 1888, p. 63 (Porto Rico, St. Thomas).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 30 (listed).—Bent, U. S. Nat. Bull. 126, 1923, p. 97 (St. Thomas, St. Croix).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 36 (Cartagena Lagoon).

Rare winter visitant. The only record for Porto Rico based on a specimen is that of one in the collection of Hjalmarson, presumably shot somewhere near Arecibo. Danforth records ten on February 27 and March 1, 1924, and a pair on March 11, at Cartagena Lagoon. Newton remarks that Riise secured one on St. Thomas, and Bent lists the bird from St. Croix.

This duck is distinguished from others found in this area by its very small bill and extensive white on the wings.

***Dafila acuta tzitzihua* (Vieillot)**

Pintail, Pato Pescuezilargo, Pato Silvestre

*Anas tzitzihua* Vieillot, Nouv. Dict. Hist. Nat., 1816, Vol. V, p. 163. (Mexico.) Pintail, Danforth, Oölogist, 1922, p. 177 (one, Lajas, April 8, 1922).

*Dafila acuta*, Gundlach, Journ. für Ornith., 1874, p. 314 (in collection of Hjalmarson); Journ. für Ornith., 1878, pp. 162, 190 (reported); Anales Soc. Esp. Hist. Nat., 1878, pp. 402 (reported near Arecibo).—Stahl, Faun. Puerto Rico, 1883, p. 65 (listed).—Cory, Auk, 1888, p. 62 (Porto Rico); Cat. West Indian Birds, 1892, p. 86 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 29 (hypothetical list).

*Dafila acuta tzitihua*, Danforth, Journal Dept. Agric. Porto Rico, 1926, Vol. X, p. 37 (Cartagena Lagoon, seen).

Apparently of rare occurrence in Porto Rico. Gundlach's records are conflicting. In 1874 he said that he saw one in the collection of Hjalmarson. (Sundevall, however, did not record it.) In the Journal für Ornithologie for 1878 Gundlach notes that this bird was shot by a friend, who described it to him; in another paper, written in Spanish, in the same year, he says that the bird was killed near Arecibo, but that he did not see it.

Danforth saw a male at Cartagena Lagoon on April 8, 1922; six on February 15, 1924; ten on February 27 and two on March 11, 1924. None were taken. In my first list I included the pintail as a hypothetical species, but in view of Danforth's records I have admitted it to the list.

***Dafila bahamensis bahamensis* (Linnaeus)**

Bahama Pintail, Bahama Duck, Pato de la Orilla, Pato Criollo, Pato de Florida

*Anas bahamensis* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, page 124. (Bahamas.)

Bahama Duck, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon, December 22, 1923).

*Dafila bahamensis*, Cory, Auk, 1888, p. 62 (Antilles); Auk, 1890, p. 373 (St. Thomas, specimen); Cat. West Indian Birds, 1892, p. 86 (Porto Rico, St. Thomas).

*Pocillonetta bahamensis*, Gundlach, Journ. für Ornith., 1874, p. 314 (in collection of Blanco); Journ. für Ornith., 1878, pp. 162, 190 (taken at Boquerón); Anales Soc. Esp. Hist. Nat., 1878, p. 403 (resident, near San Juan, Boquerón).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 153 (specimens); Ornis, 1887, p. 453 (resident).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 29 (Laguna de Guánica, breeding; Culebra Island); Auk, 1917, p. 57 (Flamenco Lagoon and Playa Brava, Culebra Island; Culebrita Island).—Struthers, Auk, 1923, p. 471 (Anegado Lagoon, nesting).



*Poecilonetta bahamensis bahamensis*, Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 38-39 (Cartagena Lagoon).

Resident and breeding in the lowlands of Porto Rico. Recorded from Culebra, Culebrita and St. Thomas.

Gundlach found this species at Boquerón and saw a specimen taken by Blanco near San Juan. Struthers noted it breeding at Anegado Lagoon, where he recorded a nest with twelve eggs, February 18, 1922, and Danforth has described it as common at Cartagena Lagoon. Cyrus S. Winch collected a specimen on the island of St. Thomas. I found it breeding commonly at the Laguna de Guánica on May 26, 1912, and on April 9 examined two breeding birds in very worn plumage shot at Playa Brava, on Culebra Island. Others frequented the Flamenco Lagoon in company with lesser scaup ducks. On April 15 I shot eight from a flock of twenty-five on a nearly dry lagoon on Culebrita Island. The birds were resting quietly on a mudbank and seemed little alarmed at the noise I made in working through the mangroves to a point within range. Their flight was rapid, and on the wing their long necks made them resemble the ordinary pintail. The flock circled swiftly over the dead birds several times before departing. The series taken includes five males and two females in breeding condition and an immature female able to fly though not quite grown.

At the Laguna de Guánica pairs or single birds rose from growths of grass and rushes standing in water and circled swiftly about. One female attempted by the usual broken wing ruse to lead me from a brood of recently hatched young, but I succeeded in capturing two before the youngsters disappeared in the rushes. (My earlier statement that these young were about five days old was in error.) Their call was a low *peep peep*. The adults call softly when in company, as do many related ducks. Natives reported to Danforth that this duck nests in grassy fields some distance from water. At Cartagena Lagoon he found young unable to fly on October 7, 11 and 17 and December 11, 1923.

This duck is the most common of the resident ducks of the island. It is easily distinguished by the prominent white of cheeks and throat, in sharp contrast to the dark crown, and by the light-brown tail. The base of the bill bears in life a spot of bright red.

The species should be guarded carefully against egggers during the breeding season.

The genus *Paecilonetta*, which is in common use for the Bahama pintail and its relatives, is currently said to be separated from *Dafila* by a difference in the relative width of the speculum and the light tip at the end of the secondaries, and by the amount of concavity of the culmen.

On examination of skins I find that in *Dafila acuta*, *D. spinicauda* and "*Paecilonetta*" *galapagensis* the speculum is broader than the light tip at the end of the secondaries, in *bahamensis* the two are about equal, and in *erythrorhyncha* the speculum is narrower than the light tip. In *acuta* the concavity of the culmen from a straight line representing its chord runs from 2 to 2.6 mm.; in *spinicauda*, from 2.2 to 3 mm.; in *bahamensis*, from 2.4 to 3 mm.; in *galapagensis*, from 2 to 3 mm.; in *erythrorhyncha*, from 2 to 2.3 mm. As there is evident no line of demarcation, I have united the two supposed groups under the name *Dafila*.

***Querquedula discors* (Linnaeus)**

Blue-winged Teal, Pato de la Florida

*Anas discors* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 205. (Virginia or Carolina.)

Blue-winged Teal, Danforth, Oölogist, 1922, p. 176 (abundant near Lajas, winter); Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Anas discors*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (2 specimens taken in winter, Porto Rico).

*Querquedula discors*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190 (specimens, Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 404 (abundant winter resident).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 154 (2 specimens, Porto Rico).—Cory, Auk, 1888, p. 63 (Antilles); Cat. West Indian Birds, 1892, p. 86 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 30 (listed).—Struthers, Auk, 1923, p. 471 (Cartagena and Anegado lagoons, winter resident).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 36-37 (Cartagena Lagoon, winter).

Regular winter resident in lagoons on coastal plain of Porto Rico (Anegado and Cartagena lagoons, near Lajas, and San Juan). Not recorded as yet from other islands.

Potts found this species near Central Aguirre, March 25, 1923. Struthers notes that the birds arrive in October (earliest date, October 8, 1921) and the majority depart in March, and he states that they come from the North in bands containing as many as three hundred individuals that break into smaller groups. Danforth recorded their presence near Boquerón until April 8, 1922, when 250 were seen. He saw 275 on Cartagena Lagoon December 22, 1923, and more than 1,000 at Anegado Lagoon on March 4, 1922. In 1924 he noted the last at Cartagena on May 2, and the first in the fall on September 6. They were common from December to April.

This teal inhabits fresh or brackish waters and may be expected in any of the lagoons of the Porto Rican lowlands. It is reported as rang-

ing through the Antilles, but has not yet been recorded from the Virgin Islands.

The species is distinguished by its small size and the pale blue color on the bend of the wing.

***Spatula clypeata* (Linnaeus)**

Shoveller, Spoonbill, Pato Cuchareta, Pato Inglés

*Anas clypeata* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 124. (Southern Sweden.)

Shoveller, Danforth, Oölogist, 1922, p. 177 (near Lajas, one seen April 1, 1922).

*Spatula maculata*, Bello, Zool. Gart., 1871, p. 350 (listed).

*Anas clypeata*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (female specimen).

*Spatula clypeata*, Newton, Ibis, 1860, p. 308 (specimen, St. Thomas).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190 (taken by Gundlach and Hjalmarsen); Anales Soc. Esp. Hist. Nat., 1878, p. 404 (fairly common, fall to April).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 153 (specimen).—Cory, Auk, 1888, p. 64 (Porto Rico, St. Thomas); Cat. West Indian Birds, 1892, p. 86 (Porto Rico, St. Thomas).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 471 (listed).—Bent, U. S. Nat. Mus. Bull. 126, 1923, p. 143 (Porto Rico, St. Thomas).—Struthers, Auk, 1923, p. 471 (Anegado Lagoon, February 18, 1922).—Danforth, Journal. Dept. Agric. Porto Rico, 1926, Vol. X, p. 37 (Cartagena Lagoon, seen).

Winter visitor to Porto Rico, where it is not uncommon; one record for St. Thomas. According to Gundlach the shoveller comes to Porto Rico in the fall and remains until April. Danforth has recorded one at Cartagena Lagoon, May 30, 1924, and another questionably at Anegado Lagoon, April 1, 1922. Struthers saw six on Anegado Lagoon, February 18, 1922.

Newton noted a specimen killed on St. Thomas by Riise.

The species, differentiated from all other ducks by the greatly expanded bill, is an inhabitant of lakes and ponds.

Subfamily FULIGULINAE

***Nyroca affinis* (Eyton)**

Lesser Scaup Duck, Pato del Medio, Pato Silvestre, Pato Morisco

*Fuligula affinis* Eyton, Mon. Anatidae, 1838, p. 157. (North America.)

Lesser Scaup Duck, Danforth, Oölogist, 1922, p. 177 (recorded through winter to March 4, 1922, near Lajas); Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

- Fulix affinis*, Newton, Ibis, 1859, pp. 366-367 (recorded questionably, March 29, 1858, St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 314 (specimens, Porto Rico); Journ. für Ornith., 1878, pp. 162, 190-191 (specimens, Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 405 (winter resident, Boquerón; Guánica; near San Juan).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 154 (specimens, Porto Rico).
- Aythya affinis*, Cory, Auk, 1888, p. 65 (Porto Rico, St. Croix); Auk, 1890, p. 373 (specimen, St. Thomas); Cat. West Indian Birds, 1892, p. 87 (Porto Rico, St. Thomas, St. Croix, Virgin Gorda).
- Marila affinis*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 28-29 (Guánica, Vieques, Culebra); Auk, 1916, p. 410 (Vieques, reported); Auk, 1917, p. 57 (Culebra, seen).—Struthers, Auk, 1923, p. 471 (Porto Rico, December to February).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 39-40 (Cartagena Lagoon, Guayabal Reservoir, winter).

Porto Rico, regular winter visitant from December to the first part of March; taken on St. Thomas by Cyrus Winch; reported from Vieques and St. Croix; ducks of this species noted by author on Culebra.

The lesser scaup is one of the common migrant ducks that comes to the lagoons of Porto Rico during winter, where it is recorded regularly from December to March. A few linger apparently through the summer, for at the Laguna de Guánica, on May 26, 1912, I shot a female and saw a dozen other ducks that I believed to be this species. On Culebra ducks that all seemed to be this species were recorded on the lagoon known as Flamenco. During the first part of April I saw about twenty-five, but on April 19, my last visit, there remained only eight. The bird taken at Guánica was a cripple unable to fly.

There are two skins in the Carnegie Museum taken at Loiza, Porto Rico, on February 11 and 12, 1912, by W. W. Worthington. Danforth found this duck common at Cartagena Lagoon, where he reported its arrival September 23, 1924, and noted the last on May 16, 1924. He has recorded it on Guayabal Reservoir.

The lesser scaup frequents open water in the large lagoons and ventures near shore only at night or in the early morning. Its food is secured mainly by diving.

In the adult male the head and neck are black glossed with purplish, and the back and scapulars are crossed by wavy bars of black and white. Immature males and females are brown, with a light mark at the base of the bill. The wing speculum is white.

#### ***Nyroca collaris* (Donovan)**

Ring-necked Duck, Pato del Medio, Pato Silvestre

*Anas collaris* Donovan, Brit. Birds, 1809, Vol. IV, Pl. 147. (Lincolnshire, England? Found in Leadenhall Market, London.)

*Fulix collaris*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190-191; Anales Soc. Esp. Hist. Nat., 1878, p. 407 (taken by Blanco).—Stahl, Faun. Puerto Rico, 1883, p. 65 (listed).

*Aythya collaris*, Cory, Auk, 1888, p. 66 (Porto Rico); Cat. West Indian Birds, 1892, p. 87 (Porto Rico).

*Marila collaris*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 28 (listed).

Accidental in Porto Rico.

Gundlach says that Blanco killed this species near San Juan. All published notes refer to this record.

The species is generally similar to the lesser scaup duck, but has the wing speculum gray.

### ***Charitonetta albeola* (Linnaeus)**

Bufflehead, Pato Pinto

*Anas albeola* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 124. (Newfoundland.)

*Charitonetta albeola*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 28 (listed).

Casual in Porto Rico. Dr. C. W. Richmond in 1900 found in a collection in San Juan a mounted bird taken by Stahl, which constitutes the only record for the island. Gundlach secured a bird many years ago in the market at Havana, Cuba—the only other West Indian record.

### Subfamily ERISMATURINAE

#### ***Erismatura jamaicensis jamaicensis* (Gmelin)**

West Indian Ruddy Duck, Pato Chorizo

*Anas jamaicensis* Gmelin, Syst. Nat., 1789, Vol. I, Pt. II, p. 519. (Jamaica.)

Ruddy Duck, Danforth, Oölogist, 1922, p. 177 (found on lagoons as late as June 28, 1922); Bird-Lore, 1924, p. 52 (Cartagena Lagoon, December 22, 1923).—Potts, Auk, 1927, p. 120 (Guayama to Guánica).

*Erismatura dominica?* Newton, Ibis, 1859, pp. 367-368 (St. Croix, refers to ruddy duck, not to the masked duck).

*Nomonyx dominicus*, Cory, Cat. West Indian Birds, 1892, p. 87 (St. Croix; apparently citing Newton as above).

*Erismatura rubida*, Gundlach, Journ. für Ornith., 1874, p. 314 (Porto Rico); Journ. für Ornith., 1878, pp. 162, 191 (taken at Guánica; secured by Blanco at San Juan); Anal. Soc. Esp. Hist. Nat., 1878, p. 407 (Guánica, abundant).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 154 (3 specimens, Porto Rico); Ornith., 1887, p. 453 (Porto Rico, breeding).—Cory, Auk, 1888, p. 68 (Porto Rico); Cat. West Indian Birds, 1892, p. 87 (Porto Rico).

*Erismatura jamaicensis*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 28 (listed).—Struthers, Auk, 1923, p. 471 (Anegado Lagoon, breeding).

*Erismatura alleni* Danforth, Auk, 1925, p. 558 (type taken Cartagena Lagoon, Porto Rico, April 19, 1925, by L. H. Mendoza; in collection of Cornell University; found at Guayabal Reservoir, Cartagena and Anegado lagoons); Journ. Depart. Agric. Porto Rico, 1926, Vol. X, pp. 41-45, Figs. 24-25 (Cartagena Lagoon, nesting).

Resident in Porto Rico (recorded from Cartagena, Anegado and Guánica lagoons, Guayabal Reservoir, and near San Juan). Potts (in litt., September 18, 1921) reports it in numbers from July 15 to September 3, 1921, on fresh-water ponds near the Central Aguirre. He alludes to it as the commonest duck between Guayama and Guánica. Danforth in 1922 reported it to the Biological Survey from lakes near Boquerón, where it was common as late as May 28. Newton found a band of ducks on St. Croix that he called the masked duck, but from his detailed account they appear to have been this species.

Gundlach, in November, 1873, found the species in abundance at the Laguna de Guánica and recorded it as breeding. Stahl also stated that it nests. During a visit to Guánica on May 26, 1912, I failed to find it, and in my previous account of the birds of Porto Rico considered the species doubtfully resident. Its breeding in Porto Rico is now established by Struthers, who located twenty-two nests at Anegado Lagoon between December 1, 1921, and March 1, 1922. Downy young were observed February 18, 1922, and sets of eggs recorded contained as many as twelve eggs. The eggs are of very large size compared with the bulk of the duck and resemble small goose eggs.

Danforth secured several specimens of this duck and on comparing them critically with birds from North America separated them as a new species, which he named *Erismatura alleni*. He distinguished *alleni* from the bird of North America on the basis of shorter wing and tail and the lack of eclipse plumage.

Through the kindness of Dr. Arthur A. Allen, I have had the privilege of examining a series of six of Danforth's birds, including the type of *alleni*, now in the museum of Cornell University. The male ruddy duck of North America molts in fall into a dark plumage that is maintained for several months and corresponds to the eclipse dress of males of many other species of ducks, which usually lasts for a few weeks only, during the period of wing molt. Danforth's statement that the ruddy duck in Porto Rico does not possess this eclipse is seemingly open to question. In one of his specimens, an adult male taken at Desengaño, Porto Rico, March 1, 1924 (Cornell University Museum No. 2482), which is in molt with wing quills about half grown and tail in process of renewal, I find that somewhat more than half of the red feathers of the

breeding plumage remain. The incoming growth of the new plumage is dark, not red, so that partly grown feathers of a dusky hue are scattered among the older ones of red color on the foreneck, sides of neck, back and sides. Nowhere do I find newly growing feathers that are red. This specimen is evidently in molt into an eclipse plumage. It is not improbable that this molt is irregular in appearance, as Porto Rico exhibits little seasonal variation through the year. This would account for high-plumaged males at all seasons. The matter should be further investigated.

Comparison of a series of ruddy ducks does not reveal as great difference in size for the West Indian bird as Danforth has noted. There is much variation in depth of red in breeding males, many birds from scattered localities in North America being as dark as the few seen from the West Indies. According to my measurements, in seventeen breeding males from Oregon, Utah, Arizona, Mackenzie, Alberta, Manitoba and North Dakota, the wing ranges from 137.0 to 148.0 mm. (average, 142.2), the culmen from base 37.2 to 42.9 mm. (average, 40.9) and the tarsus 33.1 to 36.0 mm. (average, 33.7). In two males from Porto Rico the wing ranges from 134.7 to 136.8 mm., in three the culmen from base runs from 39.8 to 42.6 mm. and the tarsus 31.6 to 32.4 mm. A male from Spanishtown, Jamaica, has the wing 139.4 mm., the culmen 41.1 mm. and the tarsus 32.6 mm.

In sixteen females, taken in the breeding season from California, Utah, New Mexico, Arizona, North Dakota and Pennsylvania, the wing ranges from 133.7 to 148.0 mm. (average, 139.7), the culmen from base 39.0 to 43.0 mm. (average, 40.8) and the tarsus from 31.0 to 34.0 mm. (average, 32.3). In one female from Porto Rico the wing measures 132.2 mm., while in two the culmen runs from 41.0 to 42.0 mm. and the tarsus from 30.0 to 32.4 mm. A female from Grenada has the wing 130.0 mm., culmen 40.1 mm. and tarsus 31.2 mm.

In all these the length of tail is disregarded, as the rectrices in this species are subject to such great wear that their measurement has little value.

Judging from the data above, the West Indian birds are seemingly distinguished from the North American group by slightly lesser size on the average—a distinction that does not appear when single skins are examined. The difference is 5 per cent or less, and is the only basis for differentiation of the two forms, which thus appear poorly characterized.

Though the West Indian bird may be recognized as slightly different, the name *Erismatura allenii* becomes a synonym of *Erismatura jamaicensis jamaicensis*, since the latter has Jamaica as its type locality, and a

skin from Jamaica in the U. S. National Museum does not differ from those from Porto Rico that were examined. The North American bird will be known on this basis as *Erismatura jamaicensis rubida* (Wilson).<sup>3</sup>

The ruddy duck is short and compact in body, with a thick, heavy neck and broad bill. It frequently swims about with the tail spread and held up at an abrupt angle with the line of the back—a peculiarity that serves to distinguish it from other ducks (except possibly from the masked duck) at a distance where colors cannot be seen. It prefers to swim or dive to escape enemies and, when forced to flight, spatters along, kicking the surface of the water with its large feet for a considerable distance before it is able to rise. Unlike most of our ducks, the male ruddy does not have an enlargement of the trachea at the side of the syrinx, but instead has developed an air-sac, connected with the trachea, that distends the entire neck. The North American bird has many peculiar mannerisms during the breeding season, and no doubt the southern representative of the species will repay watching during the nesting period.

Danforth has given an interesting account of the ruddy duck on Cartagena Lagoon, where he found it common and estimated that in 1924 one hundred pairs or more were breeding. He came upon nests from December to May, but most of the birds were breeding from February to May, with March as the height of the season. The nests were bulky masses of sedge and grass-stems, usually placed in clumps of sedges growing in water a foot deep, but occasionally floating, or at times built where the marsh was nearly dry. From four to eight eggs constituted the usual set, though he was told of one clutch of twenty-two found near Cabo Rojo. The eggs are white and measure from 62 x 48 to 65 x 50 mm. The birds were much disturbed by eggers and were hunted incessantly. They were even pursued with dogs when they were in molt and unable to fly, as at this period all the flight feathers are lost simultaneously.

The throat and back in the male of this species are rufous-chestnut, and in the female grayish brown. The bird is characterized in any plumage by the stiffly pointed tail-feathers and the very short upper coverts.

#### ***Nomonyx dominicus* (Linnaeus)**

Masked Duck, Pato Dominica, Pato Chorizo

*Anas dominica* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 201. (Santo Domingo.)

*Anas spinosa*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix, et Porto-Ricco, 1810, Vol. II, p. 209.

<sup>3</sup> *Anas rubidus* Willson, Amer. Ornith., 1814, Vol. VIII, p. 128. Pl. 71, Fig. 5. (Delaware River.)



- Anas dominica*, Ledru, cit. supra.—Sundervall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (Porto Rico, specimen).  
*Erismatura dominica*, Bello, Zool. Gart., 1871, p. 350.—Gundlach, Journ. für Ornith., 1874, p. 314 (specimens in collections of Hjalmarson and Blanco); Journ. für Ornith., 1878, pp. 162, 191 (specimens from Guánica (?), Arecibo and San Juan); Anales Soc. Esp. Hist. Nat., 1878, p. 408 (seen in collections of Hjalmarson in Arecibo and Stahl in San Juan, not found at Guánica).—Stahl, Faun. Puerto Rico, 1883, pp. 65, 154 (specimen).  
*Nomonyx dominicus*, Cory, Cat. West Indian Birds, 1892, p. 87 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 28 (listed).

Formerly of rare occurrence in Porto Rico; now perhaps extinct. A record for St. Croix by Cory apparently is based on Newton, who seems to have mistaken the ruddy duck for this species. Gundlach recorded skins in the collections of Hjalmarson, Blanco and Stahl, taken at Arecibo and San Juan. At one point, in speaking of this species and the ruddy duck jointly, he says: "Ich fand sie in Guanica," but apparently was referring only to the latter species, since in his more comprehensive paper, published in Spanish, he states distinctly that he did not see the masked duck during a week spent at the Laguna de Guánica.

The species inhabits fresh-water ponds and lakes, where abundant aquatic growths afford it cover.

It is similar in appearance to the ruddy duck, but is smaller and is distinguished by the white spot on the wing and by the darker crown, which is black in the adult male.

## Order FALCONIFORMES

### Suborder CATHARTAE

#### Family CATHARTIDAE

#### **Cathartes aura aura** (Linnaeus)

Turkey Vulture, Aura, Aura Tiñosa

- Vultur aura* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 86. (State of Vera Cruz, Mexico.)  
 Turkey Vulture, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).  
*Vultur aura*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, pp. 201, 264 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 307 ("ist nicht vorhanden").  
*Cathartes aura aura*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 30-31 (Añasco to Yauco).—Struthers, Auk, 1923, p. 471 (Añasco to Ponce).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 83 (Boquerón to Yauco).

Established in the Guánica Valley, Porto Rico; recorded north to Añasco and east to Salinas; seen casually on the summit of the Mata Platano, above Adjuntas.

The turkey vulture, it is said, was brought to Porto Rico from Cul many years ago by Spanish governmental agencies, and has established itself in the southwestern corner of the island, where it is increasing very slowly if at all. The statement sometimes made, that these birds were brought in by the Guánica Central, seems without foundation. Gundlach in 1874 is emphatic in his statement that the species does not occur, as he spent a week in November, 1873, at the Laguna de Guánica, it may be concluded that the birds were introduced at a later date, for they are too conspicuous to be overlooked. They must have made their appearance soon after his visit, however, as an old man living at Yauco told me that he had known them all his life. Mr. A. B. Baker (MSS. notes), who recorded several near Guánica in the latter part of January, 1899, seems to have been the first naturalist to observe them.

In May, 1912, I noted them regularly over the dry limestone hill above Guánica, and heard report of them from Añasco to Yauco, mainly over the coastal plain, though I was told that one had come to feed on a dead animal exposed on the summit of the Mata Platano, above Adjuntas. Mr. H. S. Brandon (in a letter to W. V. Tower, dated January 26, 1912) states that he saw buzzards on a number of occasions near Santa Rita, Fraternidad and Limón.

On May 22, 1912, I shot two adult females in the section known as La Paloma, a short distance southwest of Yauco, and preserved them as specimens. As I skinned them, I counted sixteen others circling above me and was inclined to estimate the total number here at about twenty-five. Since that time they seem to have increased somewhat, for Struthers in 1922 estimated that about fifty inhabited the Guánica Valley. He noted one near Añasco, June 13, 1921, and one at Ponce December 23, 1921, as the only birds recorded outside the area mentioned. Danforth reports that seventeen is the largest assemblage that he has seen near Cartagena Lagoon. Potts has found the turkey vulture frequently near Santa Isabel, and once near Salinas, and reports twenty in one flock at Tallaboa.

The two females taken have wing measurements of 495 and 500 mm respectively, and in size and color are representative of typical *aura*.

The turkey vulture soars easily on graceful wing in a manner that characterizes it readily, even when so far distant that its head, bare feathers, may not be seen. It feeds on carrion and gathers in rookeries to roost at night. Its large brown-spotted eggs are laid in the shelter of some overhanging rock, in a small cave or in the hollow of a tree. Reports that this bird is responsible for dissemination of diseases among

domestic stock are wholly without foundation and it should be protected as a useful species.

Suborder FALCONES

Superfamily FALCONIDES

Family ACCIPITRIDAE

Subfamily ACCIPITRINAE

***Accipiter striatus venator* Wetmore**

Porto Rican Sharp-shinned Hawk, Halcón

*Accipiter striatus venator* Wetmore, Proc. Biol. Soc. Washington, July 10, 1914, Vol. XXVII, p. 119. (The Cerro Gordo, Maricao, Porto Rico.) U. S. Dept. Agric. Bull. 326, 1916, pp. 33-34 (Maricao).—Struthers, Auk, 1923, p. 472 (Maricao).

*Accipiter striatus*, Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 306 (bones from cave near Morovís).

Porto Rico, rare; apparently confined to a small area in the forested hills above Maricao. Formerly the bird must have had a much wider range, though the only certain evidence of this is afforded by a few bones taken from a cave near Morovís.

On May 30, 1912, while I was descending the Cerro Gordo above Maricao, a small hawk soared over my head through an opening in the forest with something in its talons. I killed it by a quick shot, expecting to secure a sparrow-hawk, and was astonished, when my boy brought the bird to me, to discover that it was a fine sharp-shin, which proved to represent an undescribed form; the genus had not been recorded previously from the island. A second bird was seen on the same day, and a third I shot in the same locality on June 4, but lost it. Struthers records specimens from this region taken November 11 and December 26, 1921.

The species is distinguished from the sparrow-hawk by its blackish brown upper surface, finely barred lower parts and long, square-ended tail. The one taken had eaten a Latimer's vireo and a honey creeper, so that apparently the species has the same food preferences as have the related forms.

Subfamily BUTEONINAE

***Buteo borealis jamaicensis* (Gmelin)**

West Indian Red-tailed Hawk, Guaraguou, Guaraguou de la Sierra, Lechuza

*Falco jamaicensis* Gmelin, Syst. Nat., 1788, Vol. I, Pt. 1, p. 266. (Jamaica.)

*Falco buteo*, Moritz, Wieg. Arch. Naturg., 1836, p. 390 (listed).

*Buteo borealis*, Gundlach, Journ. für Ornith., 1874, p. 310; Journ. für Ornith., 1878, pp. 158, 163; Anales Soc. Esp. Hist. Nat., 1878, p. 159 (common, Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 58, 136 (specimens, Porto Rico).—Cory, Auk, 1887, p. 39 (Porto Rico); Cat. West Indian Birds, 1892, p. 99 (Porto Rico).—Bowdish, Oölogist, 1900, p. 72 (Vieques); Auk, 1902, p. 361 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 33 (Porto Rico, Vieques); Auk, 1916, p. 410-411 (Vieques, breeding); Auk, 1917, p. 57 (Culebra).—Struthers, Auk, 1923, p. 472 (nest, April 16, 1921, Mayagüez).—Wetmore, Auk, 1925, p. 446 (bones from kitchen midden, St. Croix).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 84 (not rare).

Fairly common resident on Porto Rico, particularly in hilly regions; a few found on Vieques and Culebra. Formerly ranged to St. Croix, as among bones from a kitchen midden near Christiansted, St. Croix, presented to the U. S. National Museum by Mrs. Hugo Hark, there are a few remains of this species. It has not been recorded in life from the island last mentioned.

During my field work the red-tailed hawk was recorded from the following localities:—

Manatí, July 7 to 11, 1912; Toa Alta, August 2; Mameyes, February 9 to 29; Maunabo, May 11; Salinas, April 30 and May 1; Juana Diaz, August 22; Yauco, May 16 to 28; Maricao, May 29 to June 5; Lares, June 22 and 26; Utuado, August 5 and 9; Adjuntas, August 10 to 16; Ciales, July 15; Aibonito, January 26 and 29; Comerio, July 27; Cayey, January 18 to 25; Caguas, January 8; Hacienda Catalina, below El Yunque, March 2 to 11; Vieques Island, March 16 to April 3, and Culebra Island, April 5 to 21.

In considering the status of the present subspecies I have had available thirty skins, all of which, except as specified, are in the U. S. National Museum; Jamaica (Spanishtown, Hartford), five (one in Museum of Comparative Zoölogy); Haiti (Sanchez, El Río, Saona Island, Constanza and Chocó, Dominican Republic; Moline, Morne de St. Vincent, Moustique, Gonave Island and Jeremie, Haiti), nineteen (one in Museum of Comparative Zoölogy); Porto Rico (Manatí, Mayagüez, Utuado), five (one in Carnegie Museum), and Vieques Island, one. These indicate that the form from the islands in question differs from *Buteo b. borealis* in smaller size and heavier markings on the under surface, which form a distinct patch across the lower breast and upper abdomen, with the dark markings on the throat also more pronounced. Five males from Porto Rico and Vieques have the wing measurement varying from 325 mm. to 344 mm. (average, 335 mm.), while in one female the wing measures 367 mm.

*Buteo tropicalis* Verrill<sup>4</sup> is a synonym of *jamaicensis* of Gmelin, sin. birds from Jamaica, Haiti and Porto Rico appear identical.

The red-tailed hawk is found wherever tracts of forest clinging to the sides of hills afford it secure aeries, but where the slopes of the land are gentle, with resultant clearing away of the trees to permit cultivation it is rare or absent. It follows that it is most common in the region of limestone hills and where forests are still found in the mountains. In its habits and notes it is identical with the red-tails of the United States. In the cooler portions of the day it is seen circling on broadly extended wings above the hills, occasionally screaming shrilly *kee-ee-ee you*, a wild cry that carries for long distances. During the warmer hours it remains on perches among the trees. It is wary, as natives kill it to eat and shoot it on every occasion. One secured for me by my friend the padre at Adjuntas was eaten by peons while the padre was busied in another part of his finca.

On January 18, 1912, I saw one carrying material to a nest on Mount Pelado near Cayey, and from then on until June the birds were observed in pairs and all seemed to have nests. A young bird only recently grown was killed at Manatí, July 11, and another young bird recently from the nest was recorded at Juana Diaz, August 22. Struthers reports a nest with two eggs on April 16, 1921, near Mayagüez.

According to the country people, the red-tail takes many chickens. As it is the custom to allow domestic fowl to run at distances from houses, such depredations would not be surprising. The hawk is also reported to eat rats and lizards. The latter must have formed a considerable part of its food before the advent of the white man brought other animals for its sustenance.

This hawk is distinguished by its large size, dark patch in the center of the lower surface and reddish-brown tail in the adult.

Its common name is guaraguou, an Indian cognomen that has survived in modern parlance. Many of the country people call it lechuza, which properly signifies an owl.

### ***Buteo platypterus platypterus* (Vieillot)**

Broad-winged Hawk, Guaraguou de Sabana

*Sparvius platypterus* Vieillot, Tabl. Encycl. Meth. 1823, Vol. III, p. 1273. (Schuylkill River, near Philadelphia, Pa.)

*Falco antillarum*, Moritz, Wiegman Arch. Naturg., 1836, p. 390 (listed, Porto Rico).

*Nisus pennsylvanicus*, Bello, Zool. Gart., 1871, p. 349 (listed, Porto Rico).

<sup>4</sup> Proc. Acad. Nat. Sci. Philadelphia, September 23, 1909, p. 357 (San Lorenzo, Dominican Republic).

*eo pennsylvanicus*, Gundlach, Journ. für Ornith., 1874, p. 310 (specimen, Porto Rico); Journ. für Ornith., 1878, pp. 158, 163 (Porto Rico, frequent); Anales Soc. Esp. Hist. Nat., 1878, p. 160 (common, Porto Rico).—Stahl, Faun. Puerto Rico, 1883, p. 58 (migrant, Porto Rico); Ornis, 1887, p. 450 (rare).

*eo latissimus*, Cory, Auk, 1887, p. 40 (Porto Rico); Cat. West Indian Birds, 1892, p. 99 (Porto Rico).

*eo platypterus platypterus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 32 (listed; Utuado).

Rare in Porto Rico; according to Gundlach, formerly common, but now perhaps extinct on this island.

The status of the present species is somewhat uncertain. Gundlach dicates that he took specimens, but does not say so definitely, nor did Stahl have it in his collection, though he listed it as a rare migrant. Dr. W. Richmond is certain that he saw one near Utuado on April 6, 1900, but did not secure it. There appear to be no specimens from Porto Rico extant, nor has the species been recorded by recent observers.

In general appearance this species is similar to the red-tailed hawk, but lacks the reddish-brown tail in the adult and is much smaller, being only sixteen inches or slightly less in length.

#### Subfamily CIRCINAE

##### **Circus hudsonius** (Linnaeus)

##### Marsh Hawk

*Falco hudsonius* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 128. (Hudson Bay.)

*Circus hudsonius*, Danforth, Auk, 1925, p. 562 (Cartagena Lagoon, seen, 1923); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 83 (Cartagena Lagoon, seen).—Potts, Auk, 1927, p. 120 (Central Aguirre, seen).

Danforth records a hawk of this species as seen from November 30 to December 27, 1923, at the Cartagena Lagoon. The bird, which was apparently immature, was not taken. Potts reports two on January 6, 1923, north of Central Aguirre. The marsh hawk can be only a casual visitant to Porto Rico; for, though it goes regularly to Cuba and the Bahamas, it is not known to range elsewhere in the West Indies.

It is a hawk of large size, distinguished by its long tail and white rump, that flies near the ground over marshes.

#### Subfamily PANDIONINAE

##### **Pandion haliaëtus carolinensis** (Gmelin)

##### Osprey, Aguila marina, Guincho

*Falco carolinensis* Gmelin, Syst. Nat., 1788, Vol. I, Pt. I, p. 263. (Carolina.) Osprey, Danforth, Oölogist, 1922, p. 177 (Boquerón).

- Falco piscator antillarum*, Moritz, Wiegmann, Arch. Naturg., 1836, p. 377 (listed).
- Pandion carolinensis*, Newton, Ibis, 1859, p. 63 (recorded questionably from St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 310; Journ. für Ornith., 1878, pp. 158, 163; Anales Soc. Esp. Hist. Nat., 1878, p. 158 (Porto Rico on authority of Blanco).—Stahl, Faun. Puerto Rico, 1883, pp. 58, 136 (specimen, Porto Rico); Ornith., 1887, p. 450 (rare, Porto Rico).
- Pandion haliaëtus carolinensis*, Cory, Cat. West Indian Birds, 1892, p. 99 (Porto Rico).—Bowditch, Oölogist, 1900, p. 72 (specimen, Vieques); Auk, 1902, p. 361 (Vieques, Mona).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 34 (Mameyes, Culebra); Auk, 1916, p. 411 (Vieques); Auk, 1917, p. 57 (Culebra).—Struthers, Auk, 1923, p. 472 (specimen, Boquerón).—Schmidt, Field Mus. Nat. Hist. Zool. Ser., 1926, Vol. XII, p. 151 (Mona).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 87 (Cartagena Lagoon).
- Pandion haliaëtus*, Wetmore, Auk, 1925, p. 446 (bones from kitchen midden, St. Croix).

Winter visitant from North America in small numbers to the coasts of Porto Rico, Mona, Vieques and Culebra; formerly at least to St. Croix.

The osprey was first recorded for Porto Rico by Moritz in 1836, but was not seen by Gundlach, who recorded it in his lists on the authority of Blanco. Stahl noted it as a migrant at the mouths of rivers, but never penetrating far inland, and secured a female. Bowditch recorded four birds on Vieques, and secured one December 31, 1899. In 1901 he also examined the foot of one killed on Mona Island.

Near Mameyes, in February, 1912, I found a few individuals at the playa, where they perched on stakes in the water or circled, screaming shrilly, in the air. A male taken here February 12 is in partial molt. At Culebra Island I recorded them on April 8 and 17.

Mr. F. A. Potts has written me that he saw the osprey near Aguirre from October, 1920, to June 6, 1921; it may remain, therefore, late in spring. Danforth noted one on Boquerón Bay, March 22, 1922, and at Cartagena Lagoon on March 11 and September 27, 1924, and Struthers secured one two miles east of Boquerón on January 15, 1921.

The Newtons were uncertain as to its occurrence in St. Croix, but recently I identified bones of this species in material presented to the U. S. National Museum by Mrs. Hugo Hark from a kitchen midden on the Richmond estate near Christiansted—proof of the former occurrence of the bird.

The osprey is a bird that soars on broad pinions above coastal lagoons or bays; it preys on fish, which it secures by swiftly darting into the water and grasping its finny prey in its strong, rough-surfaced feet to carry it off to some perch where it may be devoured. The bird is distinguished by the pure white underparts, with occasionally a spot of

brown on the breast, blackish upper surface, and white marks on the head and nape. It is marked by a strong oily odor that never leaves the feathers, as I have found it persistent in birds that have been mounted for sixty years.

Family FALCONIDAE

Subfamily POLYBORINAE

**Polyborus latebrosus** Wetmore

Porto Rican Caracara

*Polyborus latebrosus* Wetmore, Proc. Biol. Soc. Washington, December 30, 1920, p. 77, Pl. 2, Figs. 5 and 6. (Described from bone from cave on property of Don Gervacio Toraño, near Utuado.) Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, pp. 303-306, Figs. 1 and 2 (general account).

The caracara of Porto Rico is an extinct species, known only from a broken metacarpal (Figs. 2 and 3) and part of an ulna found in cave



THE EXTINCT CARACARA (*Polyborus latebrosus*)

FIG. 2.—Broken right metacarpal (type).  
Natural size. From cavern deposits near  
Utuado.

FIG. 3.—Right metacarpal (type). View  
of articular face. Natural size.

(These cuts are reproduced by courtesy of The American Museum of Natural History.)

deposits near Utuado. It is hoped that further search will bring to light additional specimens. The material indicates merely that the bird from Porto Rico is intermediate in size between *Polyborus cheriway* and *P. plancus*.

These carrion hawks are so well fitted for life in an area like Porto Rico that it is difficult to understand why they should have become extinct. The species must have lived until pre-Columbian times.

Subfamily FALCONINAE

**Falco peregrinus anatum** Bonaparte

Duck Hawk, Gavilán, Halcón de Patos

*Falco anatum* Bonaparte, Geog. and Comp. List, 1838, p. 4. (Egg Harbor, New Jersey.)

Duck Hawk, Danforth, Oölogist, 1922, p. 177 (a few near lagoons, winter; Lajas, April 1, 1922).



*Falco anatum*, Newton, Ibis, 1859, p. 63 (sternum and other bones noted, St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 310; Journ. für Ornith., 1878, pp. 158, 163; Anales Soc. Esp. Hist. Nat., 1878, p. 161 (seen, November, 1873, Laguna de Guánica).—Stahl, Faun. Puerto Rico, 1883, pp. 58, 136 (female, Porto Rico); Ornis, 1887, p. 450 (rare).

*Falco peregrinus anatum*, Cory, Auk, 1887, p. 43 (Porto Rico); Auk, 1890, p. 375 (specimen, Virgin Gorda); Cat. West Indian Birds, 1892, p. 99 (Porto Rico, Virgin Gorda).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 32 (listed, Porto Rico).—Struthers, Auk, 1923, p. 472 (male taken, Anegada Lagoon, December 3, 1921).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 84-85 (Cartagena Lagoon, winter).

Rare migrant and winter resident about larger lagoons in the coastal plain of Porto Rico. Recorded on St. Croix, and one taken by Cyrus Winch on Virgin Gorda. Stahl records a specimen from Porto Rico without giving definite data, and Gundlach notes that he saw one repeatedly at the Laguna de Guánica in November, 1873. Struthers shot a male at Anegado Lagoon on December 3, 1921, and observed the species during winter at that point and at Cartagena Lagoon. His earliest fall record is August 8, 1921. Danforth found it an irregular winter resident at Cartagena Lagoon and saw it April 1, 1922, at Anegado Lagoon. The Newtons, from St. Croix, describe the sternum and other bones of one wounded in the autumn of 1856 and kept alive for some time. Edward Newton noted a bird that he supposed to be this species on March 17, 1858.

The duck hawk is a large species that flies with great dash and vigor. It usually frequents large bodies of fresh water where waterfowl abound, and strikes terror into ducks, gallinules, coots and shore-birds, as it kills them for food with the greatest ease.

In the adult the upper surface is dark-bluish slate color, while in the immature it is brownish black. The underparts are cream buff or darker, streaked, spotted or barred with black, with a prominent mark of black below the eye. The long pointed wings and swift graceful flight differentiate it from other large hawks of this region.

### ***Falco columbarius columbarius* Linnaeus**

#### **Pigeon Hawk, Gavilán**

*Falco columbarius* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 90. (Carolina.) Pigeon-hawk, Danforth, Oölogist, 1922, p. 177 (Quebradillas, April 12, 1922); Bird-Lore, 1924, p. 52 (Cartagena Lagoon, December 22, 1923).

*Hypotriorchis columbarius*, Gundlach, Journ. für Ornith., 1874, p. 310 (specimen taken by Hjalmarson); Journ. für Ornith., 1878, pp. 158, 163 (female taken, Quebradillas; seen Laguna de Guánica); Anales Soc. Esp. Hist.

Nat., 1878, p. 162 (rare).—Stahl, Faun. Puerto Rico, 1883, pp. 58, 136 (two specimens, Porto Rico); Ornis, 1887, p. 450 (rare).

*Falco columbarius*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (specimen).—Bello, Zool. Gart., 1871, p. 349 (listed).—Cory, Auk, 1887, p. 43 (Porto Rico, St. Thomas); Auk, 1890, p. 379 (Virgin Gorda, specimen); Cat. West Indian Birds, 1892, p. 99 (Porto Rico, St. Thomas, Virgin Gorda).

*Falco columbarius columbarius*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 32 (listed).—Struthers, Auk, 1923, p. 471 (male shot November 8, 1920, Mayagüez).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 85-86 (Cartagena Lagoon, winter).

A rare migrant and winter resident in Porto Rico. Noted from St. Thomas and Virgin Gorda.

Sundevall lists a specimen taken by Hjalmarson, and Gundlach collected one at Quebradillas and saw the species at the Laguna de Guánica. Stahl had two specimens in his collection. Dr. Richmond saw a hawk at the Hacienda Catalina in March, 1900, that he believed to be this species, and on November 8, 1920, Struthers collected a male near Mayagüez. Danforth has reported it from Quebradillas, April 12, 1922; Sabana Grande, April 25, 1924, and La Plata, December 14, 1923, and March 29, 1924, and found it regularly in winter at Cartagena Lagoon (earliest October 24, 1924; latest, April 18, 1924). There are three males in the collection of the Carnegie Museum taken at Fajardo, Porto Rico, on February 21 and 26 and March 7, 1912, by W. W. Worthington.

The pigeon-hawk is a true falcon that preys extensively on birds. Although similar to the sparrow-hawk in size, it differs wholly in the lack of reddish brown on the back, the adult being slaty gray and the young dusky brown, with the underparts cream buff, streaked with black. The common name in English is given on account of its resemblance to a pigeon both in flight and repose, particularly when viewed at a distance.

### ***Falco sparverius caribaeorum* (Gmelin)**

Antillean Sparrow Hawk, Killi-Killi, Halcón

*Falco caribaeorum* Gmelin, Syst. Nat., 1788, Vol. I, Pt. I, p. 284. (No locality cited; Dominica suggested by Swann, Synop. List Acc., March 31, 1920, Pt. IV, p. 155.)

Taarn-falken, Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 640 (St. Croix). Porto Rican Sparrow-hawk, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez); Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Accalon antillarum*, Moritz, Wieg. Arch. Naturg., 1836, p. 390 (Porto Rico).

*Tinnunculus sparverius*, Newton, Ibis, 1859, pp. 63-64 (St. Croix).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 374 (St. Thomas).—Gundlach,

- Journ. für Ornith., 1874, pp. 310, 315; Journ. für Ornith., 1878, pp. 158, 163 (Porto Rico).
- Tinnunculus dominicensis*, Gundlach, Anales Soc. Esp. Hist. Nat., 1878, p. 163 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 58, 136 (Porto Rico).
- Tinnunculus caribaeorum*, Ridgway, Proc. U. S. Nat. Mus., 1884, Vol. VII, p. 172 (St. Thomas).
- Falco dominicensis*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 249 (Porto Rico).—Cory, Auk, 1887, p. 44 (Porto Rico).—Auk, 1890, pp. 374, 375 (Anegada, Tortola, Virgin Gorda).—Cat. West Indian Birds, 1892, p. 99 (Porto Rico).—Bowditch, Oölogist, 1900, p. 72 (Vieques); Auk, 1902, p. 361 (Porto Rico).
- Falco caribbaeorum*, Cory, Auk, 1890, p. 374 (Anegada); Auk, 1891, p. 48 (St. Croix); Cat. West Indian Birds, 1892, pp. 99, 139, 140 (Porto Rico, St. Thomas, St. Croix, Tortola, Virgin Gorda, Anegada).
- Falco sparverius*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Rico, 1810, Vol. II, pp. 201, 205 (listed; given as *Falco sparrerius* on p. 265).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico).—Bello, Zool. Gart., 1871, p. 349 (listed).—Cory, Cat. West Indian Birds, 1892, p. 99 (St. Croix, St. John, Tortola, Anegada).
- Falco sparverius loquacula*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 31-32 (Porto Rico, Vieques, Culebra); Auk, 1916, p. 410 (Vieques); Auk, 1917, p. 57 (Culebra).—Struthers, Auk, 1923, p. 471 (Añasco, young, July 30, 1921).
- Cerchneis sparveria*, Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 303 (bones from caves near Morovís and Utuado).
- Cerchneis sparveria loquacula*, Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 86-87 (Cartagena Lagoon).

Common resident on Porto Rico, generally distributed, but on the north coast more abundant in the foothills. Recorded during personal field work as follows:—

Quebradillas, July 2 to 6, 1912; Manatí, July 7 to 11; Bayamón, July 24 and 25; Mameyes, February 9 to 29; Humacao, September 3 to 9; Yabucoa, May 3 to 10; Salinas, April 26 to May 2; Juana Diaz, August 17 to 22; Yauco, May 16 to 28; Cabo Rojo, August 24 to 31; Aguadilla, June 11; Lares, June 18 to July 1; Adjuntas, August 10 to 16; Aibonito, January 26 to February 5; Cayey, January 18 and 22; Hacienda Catalina, below El Yunque, March 2 to 11.

The species was common on Vieques Island from March 16 to April 3, and on Culebra from April 5 to 21. It is recorded from St. Croix, St. Thomas, St. John, Tortola, Virgin Gorda and Anegada.

Mr. J. H. Riley (Smiths. Misc. Coll., November 9, 1904, Vol. XLVII, p. 284) separated the sparrow hawk from Porto Rico and the Virgin Islands as a subspecies *loquacula* (type locality Vieques Island), which he considered distinct from the Lesser Antillean form *caribaeorum* in

deeper brown on the breast, dark back, less heavily barred tail and back, and under wing coverts more spotted with black; females darker above, with more pronounced rufous spot on head and more heavily marked below. In the list of the birds of Porto Rico published in 1916 I accepted this race as valid, but on reexamination with more extensive material I find that the supposed differences are not constant. The birds from Porto Rico and the Lesser Antilles must, therefore, all be known as *caribaeorum*.

Individual variation is considerable. The series examined at this time includes the following eighty-four specimens:—

Porto Rico .....	17	males	12	females
Vieques .....	5	"	1	"
Culebra .....	8	"	6	"
St. Croix .....			2	"
St. Thomas .....	2	"	2	"
Anegada .....	1	"	1	"
Saba .....	1	"		
St. Bartholomew .....	1	"	2	"
Guadeloupe .....	1	"	3	"
Barbuda .....			6	"
St. Eustatius .....	1	"		
St. Kitts .....	1	"	1	"
Antigua .....	3	"	5	"
Nevis .....	1	"		
Dominica .....	1	"		

In Porto Rico the sparrow hawk was most common in dry areas of open brush and was found in greatest abundance on the south side. A few were observed in coconut groves on the north coast, but the species was more common in the hills above an altitude of one thousand feet.

Like all sparrow hawks, this form watches for prey from commanding perches. It is often common in coffee plantations, and the spike projecting from the summit of the royal palm is always a favorite perch. The call note is a rapid *killy killy killy* and the flight fairly swift. The bulk of the food is made up of Orthoptera, including the destructive changa, or mole cricket, as well as mice and a good many of the abundant lizards of the genus *Anolis*. Sparrow hawks were observed on a number of occasions dashing at woodpeckers or blackbirds and one examined nests of the cliff swallow along a rock ledge. Mr. A. B. Baker saw one strike an ani. Such actions seem due in many cases more to petulance or exuberance of spirit than to a desire to kill, as sparrow hawks were

seen on several occasions dashing at soaring red-tailed hawks, which they could not hope to harm. In the stomachs of the forty-eight sparrow hawks that I examined I found remains of only two birds, and with the exception of the ground doves small birds paid little attention to them.

The nesting season began in April and extended through May and June. Breeding females were taken on Culebra Island April 6, 17 and 19, and at Salinas, Porto Rico, April 30. Nests were located in holes in palms or other trees; several adults (both male and female) taken in the breeding season had the tips of the rectrices much abraded from friction in or about the nesting cavity. Gundlach states that they deposit from three to five eggs, but the largest family that I observed myself consisted of three young. The young, when first emerging from the nest, seem to feel the heat of the sun and seek perches sheltered from its rays.

These falcons are often very tame and during the breeding season scold vociferously at all intruders.

The sparrow hawk, but little larger than the blackbird or thrush, is easily recognized by its bright brown back, more or less barred with black.

## Order GALLIFORMES

### Suborder GALLI

### Superfamily PHASIANIDES

### Family PERDICIDAE

### Subfamily ODONTOPHORINAE

### *Colinus virginianus virginianus* (Linnaeus)

#### Bob-white, Quail

*Tetrao virginianus* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 161. (Carolina.)

*Ortyx virginianus*, Newton, Ibis, 1859, pp. 254-255 (St. Croix, introduced);

Ibis, 1861, p. 114 (Introduced, St. Croix).

*Colinus virginianus*, Cory, Birds West Indies, 1889, pp. 223-224 (St. Croix, after Newton).

St. Croix, introduced.

The Newtons, writing in 1859, state that the quail had been introduced into St. Croix about fifty years before by one of the governors, and that the birds had become very numerous. They bred from the end of April to the middle of July and laid from twelve to fifteen eggs. Since that day the species has entirely disappeared from this island, as there are no further reports of its occurrence there.

There is possibility that the records here given should be cited under

the Cuban quail introduced in Porto Rico, as no skins have been examined. I know of no specimens extant from St. Croix.

***Colinus virginianus cubanensis* (Gould)**

Cuban Quail, Codorniz

*Ortyx cubanensis* Gould, in Gray, Gen. Birds, May, 1846, Vol. III, p. 514. (Cuba.)

*Ortyx virginianus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, many specimens).

*Ortyx virginianus cubanensis*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico, introduced; specimens in collection of Hjalmarson); Journ. für Ornith., 1878, pp. 161, 186.

*Ortyx cubanensis?*, Gundlach, Anales Soc. Esp. Hist. Nat., 1878, p. 350 (introduced, Porto Rico).

*Ortyx cubanensis*, Stahl, Faun. Puerto Rico, 1883, pp. 62, 149 (two specimens, Porto Rico).

*Colinus cubanensis*, Cory, Auk, 1887, p. 223 (Porto Rico); Birds of West Indies, 1889, p. 223 (Porto Rico).

*Colinus cabanensis*, Cory, Cat. West Indian Birds, 1892, p. 96 (Porto Rico).

*Colinus virginianus cubanensis*, Bowditch, Auk, 1902, p. 360 (Mayagüez, seen).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 34 (listed).

Porto Rico, introduced. Probably now extinct.

According to Gundlach, the Cuban quail was brought to Porto Rico from Cuba by Don Ramón Soler, who established it in the Hacienda Santa Ines near Vega Baja, perhaps about 1860. Gundlach examined a specimen in the collection of Hjalmarson in Arecibo that had been sent to Hjalmarson, but does not seem to have found the bird himself. Stahl listed a male and a juvenile specimen in his collection, but informed Dr. Richmond in 1900 that he believed the bird had been exterminated. Bowditch flushed one on a hillside near Mayagüez, but did not secure it. There are no further records known to me.

***Eupsychortyx sonnini sonnini* (Temminck)**

Crested Quail

*Perdix sonnini* Temminck, Hist. Nat. Gen. Pig. Gall., 1815, Vol. III, p. 451. (French Guiana.)

Quail, Knox, Hist. Acc. St. Thomas, W. I., 1852, p. 221 (St. Thomas).

*Eupsychortyx sonnini*, Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas, specimens).—Newton, Ibis, 1860, p. 308 (St. Thomas, specimen).—Cory, Cat. Birds West Indies, 1892, p. 96 (St. Thomas).—Hartert, Nov. Zool., 1902, Vol. IX, p. 275 (St. Thomas).

*Ortyx sonnini*, Newton, Ibis, 1861, pp. 114-115 (St. Thomas).

*Eupsychortyx sonnini sonnini*, Todd, Auk, 1920, p. 201 (St. Thomas, specimens).

Introduced in St. Thomas; formerly common, present status uncertain.

Cassin, in 1860, recorded specimens taken by Robert Swift, with the statement that "Mr. Swift has had the kindness to inform me that this species was introduced into the Island of St. Thomas some years since from Venezuela, and that it has now become of frequent occurrence, quite naturalized, and rearing young freely throughout the island." Knox in 1852 recorded "quail" as very rare. There are no recent published accounts that mention the species; therefore, its present status is in doubt.

Todd has identified three skins from St. Thomas that he personally examined as pertaining to the typical subspecies, *E. s. sonnini*. This quail is smaller in size than the bobwhite and is heavily mottled with brown, black and white. It is easily distinguished by its slender crest.

The crested quails merge so gradually with the smooth-headed species that the two groups are of doubtful generic distinction. It is probable that *Eupsychortyx* eventually will be considered merely a subgenus of *Colinus*.

### Family NUMIDIDAE

#### *Numida galeata* Pallas

Guinea Hen, Guinée, Gallina de Guinée, Pintado

*Numida galeata* Pallas, Spic. Zoöl., 1767, Vol. I, fasc. 4, p. 13. (Based on domesticated bird.)

*Numida meleagris*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 207 (Porto Rico).—Moritz, Wiegmann. Arch. Naturg., 1836, p. 390 (mountains of Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (introduced, not rare).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 186 (specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 352 (food).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 149 (specimen).—Cory, Auk, 1887, p. 223 (Porto Rico); Cat. West Indian Birds, 1892, p. 96 (Porto Rico).—Bowditch, Auk, 1902, p. 360 (common locally, Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 34 (discussion).

Introduced in Porto Rico; formerly common, but now of doubtful occurrence except under domestication. Ledru informs us that guinea fowl were brought to the Antilles as early as 1508, and that he found

them established there at the time of his voyage. Moritz, in 1836, recorded them from the mountains of Porto Rico, and it was reported to Sundevall in 1869 that they were not rare. Gundlach found them and notes a specimen; he remarks that they sometimes cause damage in banana plantations by destroying the fruit. Stahl had a specimen in his collection, and, according to manuscript notes received from Dr. Richmond, shot one at Cabo Rojo years ago. Dr. Richmond, in 1900, noted one in a collection of mounted birds in San Juan. Bowdish, in 1900 and 1901, reported the species as common in certain localities.

In 1911 and 1912 I was told that guinea fowl still ranged in areas of natural forest on the Cerro Gordo and Monte del Estado above Maricao, in Caguana near Barros, and on El Yunque de Luquillo. They were extremely shy and I saw none. They may still exist in the larger forest areas, though doubt attaches to their present status.

The feral guinea fowl of the Antilles has been described as darker than the bird found in domestication. I have seen no specimens from Porto Rico.

In Lares, in June, 1912, I was shown a hybrid produced by a cross between a male guinea fowl and a domestic hen, a bird of curious appearance, larger than a guinea and with long neck, small head, drooping tail, and a mottled brown coloration. It was said to call somewhat like a guinea, but its note I did not hear. Such crosses are reported frequently from eastern Brazil, where they are well known.

Dr. Hartert<sup>5</sup> has indicated that the ordinary guinea fowl must be known as *Numida galeata* Pallas, since *Phasianus meleagris* Linnaeus of 1758 (which antedates *Numida meleagris* Linnaeus 1766) refers to the species that has been called previously *Numida ptilorhyncha* Lesson, and must be transferred to that form.

## Order MEGALORNITHIFORMES

### Suborder MEGALORNITHES

### Superfamily MEGALORNITHIDES

#### Family ARAMIDAE

#### *Aramus pictus elucus* Peters

#### Limpkin, Carrao, Guareao

*Aramus pictus elucus* Peters, Occ. Pap. Boston Soc. Nat. Hist., January 30, 1925, Vol. 5, p. 143. (Sosúa, Dominican Republic.)

<sup>5</sup> Vög. Pal. Fauna, September, 1921, Vol. III, p. 2006.



*Hians scolopaceus*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208 (Porto Rico).

Carrao, Moritz, Wieg. Arch. Naturg., 1836, p. 378 (Porto Rico).

*Aramus giganteus*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 314 (in coll. Hjalmarson, Porto Rico); Journ. für Ornith., 1878, pp. 162, 189 (Lares, Quebradillas, Utuado); Anales Soc. Esp. Hist. Nat., 1878, p. 387 (nests December, January).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (specimens, Porto Rico).—Cory, Cat. West Indian Birds, 1892, p. 90 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 37-38 (north slopes of El Yunque, between Adjuntas and Maricao, and near Utuado).

Porto Rico; resident, now rare. The only locality where the limpkin has been definitely known to exist in recent years is on the Hacienda Jobo between Utuado and Arecibo. In 1912 Mr. Leopold B. Strube, of the plantation in question, told me a dozen pairs were living there in a small tract of natural forest, and presented me with a specimen taken in June. In the Carnegie Museum is a male secured likewise at this place, May 20, 1912, and marked "through kindness of Mr. Leopold Strube." In addition to these, there are in the collections of the U. S. National Museum two skins secured by Latimer in the sixties.

The bird was reported in 1912 from the lower slopes of El Yunque above Río Grande, and among the peaks of El Guilarte west of Adjuntas. The latter locality may be uncertain, as natives are prone always to attribute some rare bird to a locality difficult of access. Gundlach records the species near Lares, Quebradillas and Utuado, and said that it nested in December and January.

The species is ibis-like in appearance, slightly more than two feet in length, glossy olive-brown in color, streaked on head, neck and body with white. It is found in wooded swamps or marshy savannas, where it feeds largely on snails. At the approach of anyone it rises with a curious flight in which the extended wings are checked slightly at each upward stroke, so that the method of wing movement suggests that of some huge butterfly. The limpkin is given its native name of *carrao* in imitation of its cry.

The stories told me to the effect that the limpkin runs through wet growth in early morning until its feathers become too wet for flight, with the result that it may be run down and captured by hand, may apply properly to the large flightless rail, *Nesotrochis debooyi*, since in my experience the limpkin is a bird that is heron-like in its alertness and takes to wing at any immediate danger.

## Superfamily RALLIDES

## Family RALLIDAE

## Subfamily RALLINAE

**Rallus longirostris caribaeus** Ridgway

Caribbean Clapper Rail, Pollo de Laguna, Pollo de Manglar

*Rallus longirostris caribaeus* Ridgway, Bull. Nutt. Orn. Club, 1880, p. 140.  
(Near Spanishtown, Jamaica.)

*Rallus crepitans*, Gundlach, Journ. für Ornith., 1878, pp. 162, 189 (Boquerón, Cabo Rojo, San Juan, Porto Rico; specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 388 (Boquerón, San Juan, Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens).

*Rallus longirostris*, Newton, Ibis, 1859, pp. 260-261 (St. Croix, breeding).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas, specimens).

*Rallus longirostris caribaeus*, Gundlach, Journ. für Ornith., 1874, p. 314 (reported, Porto Rico).—Cory, Cat. West Indian Birds, 1892, p. 90 (Porto Rico).—Bowditch, Auk, 1902, p. 359 (San Juan Bay, Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 36-37 (Mameyes, La Playita near Salinas, Porto Rico; Culebra Island); Auk, 1916, p. 411 (Vieques Island); Auk, 1917, p. 58 (Culebra Island).—Struthers, Auk, 1923, p. 472 (Boquerón, Porto Rico; nesting).

Porto Rico, Vieques, Culebra, St. Thomas, St. Croix; resident.

The clapper rail in this region is found in the mangrove swamps and, so far as I am aware, does not range elsewhere. Though common in some localities, it is so shy that it is seldom seen. Its presence is usually indicated by its grunting calls from the depths of the swamps, or by its long-toed tracks in soft mud, often made at night in open runs where it does not venture to appear by day.

Near Mameyes, on February 12, 1912, while watching for birds in a mangrove swamp, I secured a clapper rail as it slipped like a gray shadow through the muddy aisles of its haunt. The birds were numerous here, but in spite of long watching I saw no others. In the swampy region called La Playita, at Salinas, from April 26 to May 2, I was more fortunate. Here I found clapper rails abundant and secured eight specimens (six on April 29 and two on May 2). As the growth of mangroves covering the swamp in this area was fairly open, the birds were easily seen. Their calls came to me constantly and their tracks covered the mud everywhere. At times they were observed feeding in fairly open stretches and occasionally were noted swimming across small pools to reach desirable cover on the opposite side. When forced from shelter

in small isolated clumps of bushes, they sometimes ran swiftly, with long strides and head held well forward, across open spaces, perhaps pausing to look back curiously from the safety of a distant cover, or again flew with slow, direct flight to safer quarters. At times, when they were really frightened, the flight was fairly swift.

At this period the birds were breeding. On May 2, I secured a young bird about ten days old, coal-black in color, with stocky legs and big feet. On this occasion, too, an adult and six or eight small young were seen picking their way across the mud; at a slight noise all disappeared in the brush.

A specimen was taken at the border of a small lagoon north of Manatí, July 8, and calls and tracks of clapper rails were recorded from the mangrove swamps in the vicinity of Cabo Rojo. One bird was seen south of Aguadilla, June 11. Gundlach found the clapper rail near San Juan, Boquerón and Cabo Rojo; Bowdish secured it on San Juan Bay, and there is a skin in the U. S. National Museum obtained at San Juan, January 4, 1899, by J. D. Milligan. Struthers found a nest containing eight eggs near Boquerón, September 23, 1921.

On Vieques Island, in the latter part of March, 1912, I saw tracks of these birds in mud at the border of lagoons, and on Culebra Island from April 5 to 21, I found clapper rails common in the narrow fringe of mangroves bordering the bay called Ensenada Honda. Their loud, explosive calls came from the swamps all day long, but I saw only one individual, an adult male, that I collected, April 11, after waiting a half hour for it to appear.

The Newtons report the species as breeding in fair numbers at a large lagoon in the south of St. Croix. Cassin notes specimens sent from St. Thomas by Robert Swift, but errs in calling the birds migrants from the United States. There is one skin in the U. S. National Museum taken on St. Thomas by F. A. Ober.

Comparison of skins from Porto Rico, Culebra and St. Thomas indicates that these differ from two examined from Jamaica (type locality of *caribaeus*) in decidedly grayer, less buffy coloration both above and below. I marked them in 1912 as "*caribaeus*" pending the appearance of a revision of the species by Dr. Oberholser, and for this reason still record them here also under the same heading. Skins from Culebra, St. Thomas and Porto Rico seem to me closely similar.

The food of these rails, so far as may be judged from the eleven stomachs that I examined, is composed principally of Crustacea, mainly of the abundant fiddler crabs (*Uca pugnax rapax*). This rail is of some

importance as a game bird and should be carefully protected during the breeding season, which seems to extend from February to September.

The clapper rail is brownish above, with dark-centered feathers edged with gray; the throat is white, the breast is buffy brown and the flanks are barred with black. It is about as long as a coot, but has a more slender body.

***Porzana carolina* (Linnaeus)**

Sora, Gallinuela, Gallareta Chiquita, Gallareta de Cienaga, Dagaretilla

*Rallus carolinus* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 153. (Hudson Bay.)

Sora Rail, Danforth, Oölogist, 1922, p. 177 (Porto Rico, common, winter); Bird-Lore, 1924, p. 52 (Cartagena Lagoon, December).

*Rallus carolinus*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, specimens).

*Porzana carolina*, Newton, Ibis, 1859, p. 260 (St. Croix, specimen).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 189; Anales Soc. Esp. Hist. Nat., 1878, p. 390 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens); Ornis, 1887, p. 452 (Porto Rico).—Cory, Cat. West Indian Birds, 1892, p. 91, (Porto Rico, St. Croix).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 36 (Porto Rico, migrant).—Struthers, Auk, 1923, p. 472 (Porto Rico, winter).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 55 (Cartagena Lagoon, winter).

Porto Rico; regular winter visitant. As the species is recorded from St. Bartholomew, Grenada and Barbadoes, it may be expected to occur casually at least in the Virgin Islands.

The sora rail has been recorded in Porto Rico as a winter visitant from October to April, and at times has been common. Danforth reported it at Cartagena Lagoon until April 8 in 1922, and April 18 in 1924, and recorded fourteen birds on December 22, 1923. His earliest fall record is October 14, 1924. Struthers reports it from the large lagoons of western Porto Rico until March 25, 1921, while during the fall of that year it arrived from the north on October 8. F. A. Potts has seen it near Aguirre, March 28, April 17 and November 13, 1921. On March 5, 1900, Dr. C. W. Richmond collected a specimen at Luquillo, Porto Rico, but was unable to skin it because of illness. In the U. S. National Museum is an adult secured from Latimer, marked as from the northern side of Porto Rico. Newton tells us that on St. Croix a female was brought to him alive on April 24, 1858.

The species resides in marshes, usually where the water is not deep. There it flushes to fly for short distances with dangling feet.

The back is olive-brown, with black centers to the feathers that produce a spotted appearance, and the sides of the back are streaked with white. The breast is gray or brownish gray, the abdomen white, and the sides are barred heavily with black and white. It is about eight inches long. Adult birds have the throat black—a mark lacking in immature individuals.

***Porzana flaviventer hendersoni* Bartsch**

Yellow-bellied Rail, Gallareta Chiquita, Gallaretilla

*Porzana flaviventris hendersoni* Bartsch, Proc. Biol. Soc. Washington, July 27, 1917, Vol. XXX, p. 131. (Trou Caiman, Haiti.)

Yellow-bellied Rail, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Crybastus gossei*, Gundlach, Journ. für Ornith., 1878, pp. 162, 189 (Arecibo River, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 391 (Arecibo River, not rare).

*Laterirallus gossei*, Stahl, Faun. Puerto Rico, 1883, p. 63 (Porto Rico, rare); Ornis, 1887, p. 452 (rare).

*Porzana flaviventris*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 36 (Laguna de Guánica; Bayamón River); Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 307 (bone from cave deposits near Morovis).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 55-56 (Cartagena Lagoon).

Porto Rico; resident.

This small rail is found in marshes, in heavy aquatic growth, where it so readily escapes attention that it is probably less rare than the few records of its occurrence indicate. On May 26, 1912, at the Laguna de Guánica, I flushed two of these birds from plants growing in two feet of water at the border of a small, open pond. They rose quickly, flew high and swiftly for rails, and dropped into a dense growth of cat-tails, where they were lost to view. On July 23 one was shot, but lost in a similar situation, at the border of a small pond near the Bayamón River, a short distance from Bayamón. Mr. F. A. Potts, in a letter dated May 15, 1921, informs me that on November 14, 1920, he flushed one at the edge of a fresh-water swamp a mile north of Aguirre. Danforth noted the species regularly at Cartagena Lagoon.

Thomas Barbour, in his Birds of Cuba (Mem. Nuttall Ornith. Club, No. 6, June, 1923, p. 55), states that, though considered rare, the Cuban form of this little rail in reality swarms in extensive bonnet beds in Lake Ariguanabo and the ponds of the Cienaga. When frightened, the birds hop into a bonnet leaf and hide until assured that danger is past. He secured a series by beating this cover with a long bamboo and flushing the rails, when they afforded a quick shot. Similar methods might

reveal their presence in Porto Rico in greater numbers than is supposed to be the case.

The nest of this species, so far as I am aware, is unknown. In the U. S. National Museum there is one skin from Porto Rico, without definite data, from the Bryant collection.

Through the kindness of the authorities of the Museum of Comparative Zoölogy, I have had for examination from their collections a fine series of eighteen skins of this species, which have been supplemented by six in the U. S. National Museum. This material is distributed as follows: Surinam, 2; Cuba, 8; Jamaica, 11; Haiti, 2; and Porto Rico, 1.

The birds from Surinam, which may be assumed to represent typical *Porzana flaviventer flaviventer* (Boddaert),<sup>6</sup> are generally similar to those from the West Indies, but have a much deeper wash of buff on the breast and foreneck. Barbour<sup>7</sup> has indicated that the bird from Cuba and Jamaica may be called *Porzana flaviventer gossii* (Bonaparte).<sup>8</sup>

In the series available I find that in birds from Cuba and Jamaica the wing ranges from 65.1 to 71.4 mm., with an average of about 67 mm., and the culmen from 16.2 to 17.9 mm. In two skins from Haiti, which are similar in color to those of Jamaica and Cuba, the wing measures 62.0 and 63.5 and the culmen 14.6 and 15.9 mm., respectively. On this slight difference in size *Porzana flaviventer hendersoni* Bartsch may be held as valid. One bird seen from Porto Rico, from the old Bryant collection, measures: wing, 61.0; culmen, 16.3 mm. It belongs thus with *hendersoni*, which on this evidence seems to be the form of Porto Rico. With larger series the supposed form from the eastern Greater Antilles may merge with *P. f. gossei*.

In addition to its tiny size, the yellow-bellied rail is distinguished by its whitish underparts, with a faint wash of buff on the breast and heavy bars of black on the flanks and under tail-coverts. Above, it is deep buff and black, streaked somewhat with white, and has a dusky crown. It is only from five to six inches in length.

### ***Creciscus jamaicensis jamaicensis* (Gmelin)**

#### **Black Rail, Gallaretilla**

*Rallus jamaicensis* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 718. (Jamaica.)  
*Creciscus jamaicensis*, Gundlach, Journ. für Ornith., 1881, p. 401 (Porto Rican specimen taken by Stahl).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 153

<sup>6</sup> *Rallus flaviventer* Boddaert, Tabl. Planch. Enl., 1783, p. 52 (Cayenne).

<sup>7</sup> Birds of Cuba, Mem. Nutt. Ornith. Club, June, 1923, No. 6, p. 55.

<sup>8</sup> *Laterallus gossii* Bonaparte, Compt. Rend., 1856, Vol. 43, p. 599 (Jamaica).

(Porto Rico, specimens) ; Ornis, 1887, pp. 448, 452 (mentioned).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 36 (listed).

Porto Rico; rare migrant.

Dr. Stahl was the first who secured specimens of this secretive bird in Porto Rico; in his catalogue he says that he obtained four in all. Richmond, in 1900, saw a mounted bird in a collection in San Juan that was probably one of the Stahl specimens.

The black rail is seldom seen, but as it is no larger than a sparrow, lives in dense marshes and is flushed with difficulty, thus coming infrequently to attention, it may be more common than is supposed. The head and breast are slate color, the back, wings and abdomen brownish black, barred or spotted with white, and the nape dark reddish brown. The total length is only five inches.

### **Nesotrochis debooyi** Wetmore

#### De Booy's Rail

*Nesotrochis debooyi* Wetmore, Proc. U. S. Nat. Mus., November 21, 1918, Vol. 54, p. 516, Pl. 82. (Kitchen midden deposits, Magen's Bay, St. Thomas.)

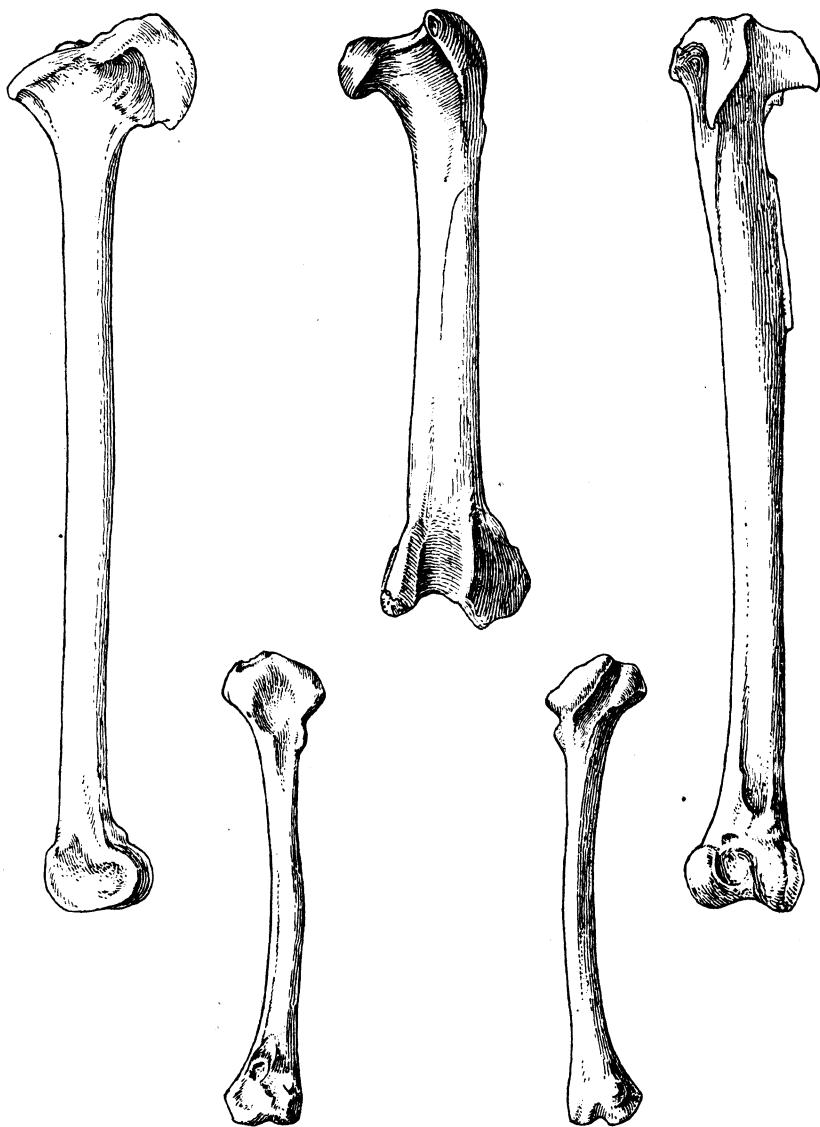
*Nesotrochis debooyi* Wetmore, Proc. U. S. Nat. Mus., November 21, 1918, Vol. 54, pp. 516-519, 520-521, Pl. 82 (Magen's Bay, St. Thomas; mouth of Salt River, St. Croix); Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, pp. 307-311 (caves near Morovís and Utuado, Porto Rico); Auk, 1924, p. 446 (near Christiansted, St. Croix).

Known only from bones taken from kitchen middens on the shore of Magen's Bay, St. Thomas, near the mouth of Salt River, and on the Richmond estate near Christiansted, St. Croix, and from caves in the vicinity of Morovís and Utuado on Porto Rico.

This remarkable flightless rail (Figs. 4 to 8), discovered during archeological investigations by the late Theodoor de Booy, of the Museum of the American Indian, in New York City, has been represented subsequently in kitchen midden material from the Richmond estate on St. Croix, presented to the U. S. National Museum by Mrs. Hugo Hark. Cave remains extend its range to Porto Rico and eventually it may be discovered elsewhere. It was described originally from femora and tibio-tarsi, while more recent finds have included humeri (which are so slight as to make it certain the species was truly flightless), and parts of a pelvis and metatarsus.

*Nesotrochis* seems to have been allied to the wood rails of the genus *Aramides*, though quite distinct from them in the more robust legs and weakened wing. It was about as large as a small domestic fowl.

That the flesh of this rail was prized by Indians seems certain from



THE EXTINCT DE BOOY'S RAIL (*Nesotrochis debooyi*)

FIG. 4 (upper left).—Left tibio-tarsus. Internal view. Natural size. From cavern deposits of Cueva San Miguel.

FIG. 5 (upper right).—Left tibio-tarsus. Anterior view. Natural size. From cavern deposits of Cueva San Miguel.

FIG. 6 (upper middle).—Left femur. Anterior view. Natural size. From cavern deposits of Cueva Clara.

FIG. 7 (lower left).—Left humerus. Anterior view. Natural size. From Cueva San Miguel.

FIG. 8 (lower right).—Left humerus. Posterior view. Natural size. From Cueva San Miguel.

(Courtesy American Museum of Natural History.)



the abundance of its bones in the vicinity of ancient residence si None of the remains known seem particularly old, and it is possible t the species was in existence in small numbers during historic tim While in Porto Rico, in 1912, I was told that in earlier days the nativ were accustomed to hunt a large bird known as the *carrao* on foot wi dogs in the early morning when vegetation was drenched with hea dew. As the bird fled from its pursuers through the grass and fern, feathers in a short time became so thoroughly soaked that it was unable to fly and eventually was tired out and captured alive. The *carrao* of today is the limpkin (*Aramus pictus elucus*), a species that, like a heron or ibis, flies at the slightest alarm to a safe distance. It is so strong on the wing that one can hardly imagine its becoming so wet as to be unable to fly, which opens the interesting supposition, mentioned more briefly on an earlier page, that the *carrao* of earlier days may have referred to the large flightless rail.

Where bones of any description are found in caves or kitchen middens, they should be saved for study in the possibility that they may fill some of the many gaps in our knowledge of this and other species.

### Subfamily GALLINULINAE

#### ***Ionornis martinicus* (Linnaeus)**

Purple Gallinule, Gallareta Platanera, Gallareta Martiniqueña, Gallareta, Dagareta

*Fulica martinica* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 259. (Martinique.)

Purple Gallinule, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon, Porto Rico).

*Hydrogallina Martinica*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Ricco, 1810, Vol. II, p. 209 (Porto Rico).

*Fulica martinica*, Moritz, Wieg. Arch. Naturg., 1836, p. 378 (Porto Rico).

*Porphyrio martinica*, Taylor, Ibis, 1864, p. 171 (Porto Rico, abundant).

*Gallinula martinica*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, 7 specimens).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Porphyryla martinica*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190; Anales Soc. Esp. Hist. Nat., 1878, p. 392 (Porto Rico, common).—Staël, Faun. Puerto Rico, 1883, pp. 63, 153 (Porto Rico, specimen).

*Ionornis martinica*, Cory, Cat. West Indian Birds, 1892, p. 91 (Porto Rico).

*Ionornis martinicus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 36 (listed).—Struthers, Auk, 1923, p. 472 (Cartagena and Anegado lagoons, Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 56-59, Fig. 28 (Cartagena Lagoon, breeding).

Porto Rico, resident. Formerly common, now seemingly rather rare. Taylor in 1864 recorded the purple gallinule, and Gundlach, a few years later, also found it common. It was taken by all the early naturalists, and Hjalmarson, of Arecibo, forwarded seven skins to Sundevall. In more modern times the species became less numerous. Dr. Richmond, on March 3, 1900, observed the bird among mangroves near Luquillo, and F. A. Potts, in a letter dated May 15, 1921, informs me that he saw one in a pool in the Guaiminí River bed, about two miles south of Guayama, on May 9, 10 and 13, 1921. Struthers has found it recently at Anegado and Cartagena lagoons. At the latter locality Danforth has found it fairly common but very shy. He reports nests in April and May and again in September and October, so that these birds appear to have two breeding periods in the year. The majority of the nests that he found were placed in clumps of cat-tails from two to six feet from the water. He found from two to six eggs in a set and describes them as light buff with blotches and spots of rufous brown and pale lavender. They measure from 1.60 x 1.15 inches to 1.70 x 1.20 inches (40.6 x 29.2 mm. to 43.2 x 30.5 mm.).

In the Museum of Comparative Zoölogy there are two skins from Porto Rico, one secured from Dr. Stahl and another (received from the U. S. National Museum) taken by G. Latimer. In the collections of the U. S. National Museum are three old skins, including two immature specimens secured from Latimer, and an adult from the Bryant collection. For none of the five mentioned are there definite data.

The present species is of a form similar to that of the common gallinule, but is smaller, and is marked in the adult by the rich purple of the breast and neck, and the green of the back.

### ***Gallinula chloropus portoricensis* Danforth**

Antillean Gallinule, Gallareta de Agua, Yagareta, Dagareta, Gallinaza

*Gallinula chloropus portoricensis* Danforth, Auk, 1925, p. 560. (Cartagena Lagoon, Porto Rico.)

Florida Gallinule, Danforth, Oölogist, 1922, p. 177 (Porto Rico, resident; possibly in part migrant); Bird-Lore, 1924 p. 52 (Cartagena Lagoon, Porto Rico).

*Fulica chloropus*, West. Beytr. Besch. St. Croix, 1794, p. 243 (St. Croix).

*Hydrogallina chloropus*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 209 (Porto Rico).

*Gallinula galeata*, Newton, Ibis, 1859, p. 260 (St. Croix, resident).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas, specimen).—Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico).—Sundevall. Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico,

specimens).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190; Anales Soc. Esp. Hist. Nat., 1878, p. 391 (Porto Rico, specimens).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens).—Cory, Auk, 1891, p. 41 (St. Croix, specimen); Cat. West Indian Birds, 1892, p. 91 (Porto Rico, St. Thomas, St. Croix).—Bowditch, Auk, 1902, p. 359 (Aguadilla and Mayagüez, Porto Rico).

*Gallinula galeata galeata*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 35-36 (Porto Rico, habits, food); Auk, 1916, p. 411 (Vieques, reported); Auk, 1917, p. 58 (Culebra, specimen).—Struthers, Auk, 1923, p. 472 (Anegado and Cartagena lagoons, Porto Rico).

*Gallinula chloropus*, Wetmore, Proc. U. S. Nat. Mus., 1918, Vol. 54, p. 520 (bones from kitchen midden, St. Croix).

*Gallinula chloropus portoricensis* Danforth, Auk, 1925, p. 560-561 (Cartagena, Anegado and Guánica lagoons, Cabo Rojo Lighthouse, Aguadilla and Mayagüez); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 59-62, Fig. 29 (Cartagena Lagoon, habits).

Resident in Porto Rico; recorded from Vieques, Culebra, St. Croix and St. Thomas.

On Porto Rico in 1912 I found this gallinule near Añasco, June 8; Joyuda, August 24 to 31; Bayamón, July 24; Laguna de Guánica, May 26, and Yabucoa, May 3 to 8. The species is reported as abundant at Cartagena and Anegado lagoons, and is recorded from the Río Arecibo, Aguadilla, Mayagüez and Cabo Rojo Lighthouse. It is reported reliably from Vieques, and I secured a specimen on Flamenco Lagoon, Culebra Island, on April 19, 1912, where I considered it migrant. Newton reported it as breeding commonly on St. Croix, and Swift sent a specimen from St. Thomas to Cassin.

When compared in series, gallinules of this species from the Antilles (and Bahamas) differ from those of the continent of North America in restriction of the brown coloration of the back, which in most specimens does not extend markedly onto the wing coverts. From *G. c. galeata* of South America they are separated by slightly darker shade of gray. Danforth has distinguished the bird from Porto Rico as *Gallinula c. portoricensis*, a name that will apply to the birds of the Greater Antilles, the Lesser Antilles south at least to Dominica, and part at least of the Bahamas, as I have found by examination of a fair series of skins in the U. S. National Museum. I have identified as this form skins from the following islands: Watlings Island, Bahamas (one), Cuba (three), Jamaica (one), Santo Domingo (four), Porto Rico (four), Culebra Island (one), Barbuda (two), Antigua (four), Montserrat (two), Guadeloupe (three) and Dominica (two). A bird in worn plumage from Tobago is assigned here with some question.

*Gallinula chloropus cerceris* Bangs, described (Proc. New England Zool. Club, May 17, 1915, Vol. V, p. 98) from St. Lucia, is distinguished by its very dark, almost blackish color. The type, which I have examined in the Museum of Comparative Zoölogy, is darker than any other I have seen. A second specimen (M. C. Z., No. 28,592), marked from the same island, does not differ, however, from other West Indian birds. If the latter is correctly labeled as to locality, it brings up the interesting possibility that the type of *cerceris* is a melanistic, and therefore an abnormal, individual. Should this prove true, then *cerceris* will replace *portoricensis* as the name for the West Indian bird.

It is probable that *G. c. cachinnans* of North America is migrant to Cuba and perhaps elsewhere in the Greater Antilles.

The gallinule in form and color is superficially similar to the coot, but may be distinguished easily by the bright-red frontal shield. In the hand the smooth toes, without the broad fringing lobes of those of the coot, are easily diagnostic. Ordinarily the gallinule is found in marshes, where it has the secretive habits of a rail, but on occasion it swims about with nodding head in the open water of channels or ponds where it moves freely, seemingly with as much ease as though its feet were webbed. When startled, it makes at once for the cover of the reeds, either across the surface of the water or on the wing. Occasionally gallinules perch on branches or in rushes several feet above the water.

At the Laguna de Guánica in 1912 gallinules were abundant; their cackling and calling from the high grass was the dominant sound of the marsh.

Danforth has reported them nesting in Porto Rico at all times of the year, but most commonly from February to May. Struthers noted a nest containing four eggs at Anegado Lagoon, December 10, 1921, and seven newly hatched young at Cartagena, August 18, 1921. I found newly hatched young near Yabucoa, May 8, 1912, and observed nests with eggs at Guánica, May 26 of the same year. The nests are shallow platforms of grass and cat-tail stems, built to an elevation of two to six inches above the water. The eggs, from three to eight in a set, resemble those of coots closely, so that care must be used not to confuse the two. Danforth gives average measurements as 1.8 x 1.2 inches (45.7 x 30.5 mm.). The young, when first hatched, are jet black.

Newton noted that on St. Croix they nested in April. An adult male that I shot on Flamenco Lagoon, Culebra Island, April 19, 1912, had the sexual organs small, while a male and two females secured at Yabucoa, May 6 and 8, were breeding.

## Subfamily FULICINAE

**Fulica caribaea** Ridgway

Caribbean Coot, Gallinazo, Gallareta, Yagareta, Dagareta negra

*Fulica caribaea* Ridgway, Proc. U. S. Nat. Mus., 1884, Vol. VII, p. 358. (St. John.)

Coot, Danforth, Oölogist, 1922, p. 177 (Western Porto Rico, nesting in October).

American Coot, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon, Porto Rico).

*Fulica americana*, Newton, Ibis, 1859, p. 260 (St. Croix).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 60 (Porto Rico, specimen).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 190; Anales Soc. Esp. Hist. Nat., 1878, p. 394 (Laguna de Guánica, Camuy, Río Arecibo, Porto Rico, specimens; nesting in November).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 153 (specimens); Ornith., 1887, pp. 452-453 (nesting).—Cory, Cat. West Indian Birds, 1892, p. 91 (Porto Rico, St. Croix).—Struthers, Auk, 1923, p. 472 (Anegado and Cartagena lagoons, Guayabal Reservoir, Porto Rico; nesting November to March).*Fulica americana americana*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 34-35 (Guánica and Manatí, Porto Rico, Culebra Island; food habits).*Fulica caribaea* Ridgway, Proc. U. S. Nat. Mus., 1884, Vol. VII, p. 358 (Guadeloupe, St. John).—Cory, Cat. West Indian Birds, 1892, p. 91 (Porto Rico, St. John).—Wetmore, Auk, 1917, p. 57 (Culebra Island, Porto Rico).*Fulica caribaea major* Danforth, Auk, 1925, p. 561 (Cartagena Lagoon, Porto Rico); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 62-65, Figs. 30-31 (Cartagena Lagoon, habits).

Porto Rico, common resident on large lagoons (Guánica, Cartagena, Anegado, Guayabal, Camuy, Río Arecibo); St. Croix, recorded doubtfully by Newton; Culebra Island; St. John (type locality).

There has been much confusion with regard to the resident coot of Porto Rico, which for years was recorded as the American coot, *Fulica americana*, and was so listed by me in my Birds of Porto Rico, published in 1916. A subsequent examination of the only specimen of this bird that I secured revealed my error, and in 1917 I called attention to the fact that the resident species of Porto Rico was *Fulica caribaea*. The Caribbean coot is exactly similar to the North American form in appearance and habits, and differs only in more or less enlargement of the frontal shield, which has its surface somewhat wrinkled. This frontal shield is light in skins and is also light-colored in life. Danforth has attempted to separate the Porto Rican coot as a subspecies, *Fulica caribaea major*, on a supposed basis of greater size, but this appears inadvisable. For three males from Porto Rico he gives wing

measurements of 190 to 195 mm., and for one female, 191 mm. I have personally examined fifteen specimens from the following localities: Haiti (four), Porto Rico (one), St. John (two, including the type of *caribaea*), Barbuda (three), Antigua (three) and Guadeloupe (two). In five males the wing varies from 178.0 to 191.0 mm. and in eight females from 165.0 to 186.0 mm., without reference to locality. (The two not included above are from Guadeloupe without designation of sex, and measure 174.0 and 183.0 mm.). The type specimen of the species from St. John has the wing 191.0 mm., equal to Danforth's measurements of his Porto Rican birds. Under these circumstances I must consider that he is mistaken in his premise that the Porto Rican bird differs, especially since the female that I secured personally at the Laguna de Guánica has the wing only 171.0 mm. long.

In the table herewith are measurements of specimens that I have examined.

Museum and number	Sex	Locality	Date	Wing	Tail	Culmen with frontal shield	Tarsus
U. S. N. M. 252,872	♂	Trou Caiman, Haiti	April 7, 1920	186.0	46.0	51.2	62.4
M. C. Z. 70,027	♂	El Batey, Santo Domingo	April 5, 1916	181.0	47.5	47.0	59.8
U. S. N. M. 81,020	♂	St. John.....	.....	191.0	50.7	57.5	61.5 type
U. S. N. M. 191,063	♂	Barbuda.....	Sept. 23, 1903	181.0	52.4	53.5	61.3
U. S. N. M. 191,062	♂	Barbuda.....	Sept. 23, 1903	178.0	50.1	49.0	58.7
U. S. N. M. 250,528	♀	Port de Paix, Haiti	April 14, 1917	178.0	46.6	45.0	52.0
M. C. Z. 70,026	♀ ad	El Batey, Santo Domingo	April 5, 1917	178.0	42.5	49.0	55.6
U. S. N. M. 240,246	♀	Guanica, P. R.	May 26, 1912	171.0	45.4	48.8	59.0
U. S. N. M. 81,021	♀	St. John.....	.....	170.	51.0	47.3	50.2
U. S. N. M. 191,067	♀	Antigua.....	July 21, 1903	168.0	42.5	43.2	54.3
U. S. N. M. 191,065	♀	Antigua.....	July 25, 1903	165.0	49.0	44.4	54.4
U. S. N. M. 191,066	♀	Antigua.....	July 30, 1903	183.0	50.1	50.5	57.2
U. S. N. M. 191,064	♀	Barbuda.....	Sept. 23, 1903	186.0	49.3	50.3	60.2
U. S. N. M. 109,046	?	Guadeloupe....	.....	183.0	45.2	55.4	62.0
U. S. N. M. 82,492	?	Guadeloupe....	.....	174.0	47.0	49.0	57.2

The Caribbean coot is a species of dark slate coloration, blackish about the head, with markings of white on wings and tail, that is seen swimming in large lagoons. As it moves, it nods the head rapidly, in time with the strokes of its large, widely lobed toes. The frontal shield in life is clear white.

Coots feed by picking with their sharp bills at the surface of the water

or dive in the shallows to secure food below. When startled, they start out with rapidly beating wings, but stroke for some distance with their large feet before they are able to rise completely in the air. As they rush away, little jets of water spurt up behind at each stroke of the toes.

Gundlach found them nesting at the Laguna de Guánica in November, and Struthers records eggs at Anegado Lagoon from November 11, 1921, to March 1, 1922. He observed from four to seven eggs in a set. The species is much molested by egg hunters, and Struthers recorded that one thousand two hundred eggs were marketed during the season noted above. The prolongation of the breeding period was probably due to this systematic robbery. As many as three thousand birds were counted at Cartagena Lagoon in the summer of 1921, when the lagoons at Guánica and Anegado dried during a prolonged drouth, and Danforth recorded an equal number at the same place on December 22, 1923. He found them breeding throughout the year, but most abundantly in April, May and October. Of more than three hundred nests seen, the greater part were concealed in sedges or grass, while a few were anchored to cat-tails standing in water. Complete sets varied from one to eight eggs, with an average measurement of 1.95 x 1.3 inches (49.5 x 33.0 mm.).

On Culebra Island I shot one of these birds at Flamenco Lagoon, April 13, but lost it through theft by a cat. Another was seen on April 19. I was under the impression that these birds were migrant, but in this supposition I may have been mistaken. Newton records coots as doubtfully seen on St. Croix, but did not list them positively, as he shot no specimens. A pair from St. John in the U. S. National Museum, the male of which is the type of the species, constitutes the only record for that island.

[***Fulica americana*** Gmelin

Coot

*Fulica americana* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 704. (North America.)

For many years the coot of Porto Rico was listed as the present species, but, as has been recounted above, the breeding bird of the island proves to be *Fulica caribaea*. The North American bird is common in winter in Cuba, and I have examined specimens taken on the island of Haiti. It is not improbable, therefore, that it will be found eventually as a winter migrant in Porto Rico, for it is a species of relatively strong flight when once on the wing. Until specimens have been collected, it must be held in the hypothetical list.

*Fulica americana* may be distinguished from *caribaea* by the narrower frontal shield, with surface smooth and hard, and colored deep red or

reddish brown at the upper end. In *caribaea* the frontal shield is light in color throughout, is broadened and widened behind, and has the surface wrinkled and roughened in skins (possibly smooth but soft in freshly killed specimens). Care must be used to avoid confusion in immature specimens of *caribaea*, which have the frontal shield narrowed as in *F. americana*; in *caribaea*, however, this shield is light in color.]

## Order CHARADRIIFORMES

### Suborder CHARADRII

#### Superfamily JACANIDES

##### Family JACANIDAE

##### ***Jacana spinosa violacea* (Cory)**

West Indian Jacana, Gallito

*Parra violacea* Cory, Bull. Nutt. Ornith. Club, 1881, p. 130. (Gantier, Haiti.)

*Parra jacana*, Gundlach, Journ. für Ornith., 1878, pp. 162, 189 (Trujillo, Porto

Rico, according to Blanco); Anal. Soc. Esp. Hist. Nat., 1878, p. 385.—

Stahl, Faun. Puerto Rico, 1883, p. 63 (listed); Ornis, 1887, p. 452 (listed).

*Jacana spinosa*, Cory, Cat. West Indian Birds, 1892, p. 92 (Porto Rico).—

Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 38 (listed).

*Jacana spinosa violacea*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 14 (Porto Rico).

Porto Rico; apparently accidental.

The only record is that of Gundlach, who states that Blanco received a specimen from Trujillo, but in such a state of decomposition that it served only to identify the species. The bird is found regularly on the adjacent island of Santo Domingo.

The jacana has a body about as large as that of a snipe, mounted on stiltlike legs and greatly elongated toes, which enable it to run about on vegetation floating on the surface of the water in ponds and swamps. The head and neck are black, the body purplish brown, and the wing quills yellowish green. The bend of the wing bears a formidable, sharply pointed spur.

#### Superfamily CHARADRIIDES

##### Family HAEMATOPODIDAE

##### ***Haematopus palliatus palliatus* Temminck**

Oyster-catcher, Coracolero, Ostrero

*Haematopus palliatus* Temminck, Man. Ornith., ed. 2, 1820, Vol. II, p. 532. (Venezuela.)

*Haematopus palliatus*, Newton, Ibis, 1861, p. 115 (St. Thomas, specimen).—



Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 162, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 379 (Porto Rico, specimen from near San Juan in collection of Blanco).—Stahl, Faun. Puerto Rico, 1883, p. 63 (listed); Ornis, 1887, p. 449 (listed).—Cory. Auk, 1887, p. 230 (Porto Rico); Cat. West Indian Birds, 1892, p. 95 (Porto Rico).—Bowdish, Auk, 1902, p. 360 (Desecheo Island).—Wetmore, U. S. Dept. Agric. Bull, 326, 1916, p. 38 (Culebra and Culebrita, reported; seen on Desecheo); Auk, 1917, p. 58 (Culebra and Culebrita, reported); Auk, 1918, p. 338 (Desecheo).—Ridgway, U. S. Nat. Mus., Bull. 50, 1919, Pt. 8, p. 35 (Porto Rico, St. Thomas).

Porto Rico (reported near San Juan); Desecheo; Culebra (reported); Culebrita (reported); St. Thomas.

In recent years the oyster-catcher has been found only on the rocky island of Desecheo, where it was seen by Bowdish in 1900 and 1901, and where I noted three individuals at intervals from June 13 to 16, 1912. These birds frequented rocky beaches and were so wild that I secured none for specimens. On Porto Rico the species is known only from the records of Gundlach, who examined a specimen taken by Blanco near San Juan, and of Stahl, who lists it but had no skins. On Culebra and Culebrita I was told that the birds came at times to rocky points, where indeed conditions were wholly favorable for them. Newton years ago saw a specimen taken by Riise on St. Thomas. I know of no skins in the United States from this region.

The oyster-catcher is a shorebird of large size, distinguished by its long, reddish-orange bill, black head and neck, grayish-brown back and white underparts. Its note is a shrill high-pitched whistle.

#### Family CHARADRIIDAE

#### Subfamily CHARADRIINAE

#### *Charadrius melodus* Ord

#### Piping Plover, Playero, Playante, Frailecillo Melodico

*Charadrius melodus* Ord, Reprint of Wilson's Orn., 1824, Vol. VII, p. 71. (Great Egg Harbor, New Jersey.)

*Aegialeus melodus*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 189 (specimen in collection of Blanco); Anales Soc. Esp. Hist. Nat., 1878, p. 385 (Porto Rico, observed).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 162 (Porto Rico, specimens); Ornis, 1887, p. 449 (Porto Rico, migrant).

*Aegialitis meloda*, Cory, Cat. West Indian Birds, 1892, p. 95 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 38 (Porto Rico, listed).

*Charadrius melodus* Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 130 (Porto Rico).

Porto Rico; rare migrant.

Gundlach examined a specimen taken near San Juan in the collection of Blanco. Stahl records the species as arriving in August, and had two specimens, which were identified in 1900 by Dr. C. W. Richmond in San Juan. There are no further records.

The piping plover should occur on beaches and mud flats near the coast. It is one of the smallest of our plovers. Though somewhat similar to the semipalmated plover, it may be recognized by the fact that the back is light gray in color and the dark breast-band is usually interrupted at its center.

***Charadrius semipalmatus* Bonaparte**

Semipalmated Plover, Playero, Playante

*Charadrius semipalmatus* Bonaparte, Journ. Acad. Nat. Sci. Philadelphia, 1825, Vol. V, p. 98. (Coast of New Jersey.)

Semipalmated Plover, Danforth, Oölogist, 1922, pp. 10, 177 (Porto Rico).

*Actialeus semipalmatus*, Gundlach, Journ. für Ornith., 1874, p. 314 (Porto Rico, specimens); Journ. für Ornith., 1878, pp. 162, 189 (Mayagüez, Arecibo); Anales Soc. Esp. Hist. Nat., 1878, p. 384 (September, April, May, June).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens); Ornis, 1887, p. 449 (migrant, arriving in August).

*Actialitis semipalmata*, Cory, Auk, 1887, p. 229 (Porto Rico); Auk, 1890, p. 374 (Anegada, specimen); Cat. West Indian Birds, 1892, p. 95 (Porto Rico, Anegada).

*Charadrius semipalmatus*, Sundevall, Öfvers, Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 38 (Porto Rico; Vieques, seen); Auk, 1916, p. 411 (Vieques, seen).—Struthers, Auk, 1923, p. 472 (Porto Rico, common).

Porto Rico, Vieques (seen) and Anegado. Migrant from north, most common from October to May.

The semipalmated plover is distinguished from other small plovers of this region by the dark-brown back. The chest is crossed by a prominent dark band and there is a distinct web between the middle and inner toes.

The species is found in coastal regions on sandy beaches or mud flats, often in small bands. Gundlach noted it near Mayagüez and Arecibo, and recorded it in September, April, May and June. According to Stahl, it arrives from the north about the middle of August. A specimen from his collection was seen by Richmond in San Juan in 1900, who, further, shot two near Luquillo on March 5, 1900, but was ill at the time and therefore not able to skin them. A bird in winter plumage, collected by Stahl, is now in the Museum of Comparative Zoölogy. Struthers has taken these birds during every month in the year (on the

western coast), but notes that they are more common from October to May. In the Carnegie Museum there are two skins obtained by W. W. Worthington at Loiza, on February 12, 1912.

On March 30, 1912, I saw one on the beach of Vieques Island, but failed to secure it; for when approached, it flew directly north over the sea until lost to view. Winch collected a specimen on Anegada for Cory.

The species may be expected to occur on all the islands concerned in the present report.

### **Pagolla wilsonia wilsonia** (Ord)

Wilson's Plover, Playero, Playante, Corredor, Frailecillo Cabezón

*Charadrius wilsonia* Ord, in Wilson, Amer. Orn., 1814, Vol. IX, p. 77, Pl. 73, Fig. 5. (Cape May, New Jersey.)

Plover (?), Knox, Hist. Acc. St. Thomas, W. I., 1852, p. 221 (occasional).

*Hiaticula wilsoni*, Bello, Zool. Gart., 1871, p. 350 (listed).

*Ochthodromus wilsonius*, Gundlach, Journ. für Ornith., 1874, p. 313 (specimen); Journ. für Ornith., 1878, pp. 162, 189 (Cabo Rojo and Arecibo); Anales Soc. Esp. Hist. Nat., 1878, p. 381 (Porto Rico, resident).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, resident; specimens); Ornis, 1887, p. 450 (Porto Rico, resident).

*Aegialitis wilsonius*, Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas, specimens).—Cory, Auk, 1890, pp. 374-375 (Anegada, Virgin Gorda, specimens); Cat. West Indian Birds, 1892, p. 95 (Porto Rico, St. Thomas, Virgin Gorda, Anegada).—Bowdish, Oölogist, 1900, p. 72 (Vieques, specimen).

*Aegialitis wilsonia rufinucha*, Bowdish, Auk, 1902, p. 360 (Vieques).

*Ochthodromus wilsonius rufinuchus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 38 (Porto Rico, Vieques, and Culebra).—Struthers, Auk, 1923, p. 472 (Añasco and Porto Real, specimens).

*Eupoda wilsonia rufinucha*, Wetmore, Auk, 1916, p. 411 (Vieques); Auk, 1917, p. 58 (Culebra, specimen).

*Pagolla wilsonia wilsonia*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 110 (Porto Rico, Vieques, St. Thomas, Anegada, Virgin Gorda).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 79-80 (Cartagena Lagoon).

Porto Rico (Cabo Rojo, Porto Real, Añasco, Arecibo, Loiza, Salinas and Aguirre); Vieques, Culebra, St. Thomas, Virgin Gorda and Anegada. Resident.

Wilson's plover is found in small numbers on sandy beaches along the coasts of the various islands. Though nowhere common, it is widely distributed and should be recorded on other islands in addition to those listed. It is supposed to be resident but may travel to some extent outside the breeding season.

The Wilson's plover of the West Indies was at one time supposed to

be different from that of North America, but recent studies have shown that birds from the two localities are identical. I have compared series and can see no differences.

Gundlach secured this bird at Cabo Rojo and Arecibo, and it is probable that it occurs near San Juan, since Stahl had specimens in his collection. Struthers has collected it near Añasco, July 23, 1921, and at Porto Real, July 25, 1921. Mr. F. A. Potts writes me that he found it from December, 1920, to May, 1921, at Las Mareas, southeast of Salinas, and that it was seen through the summer of 1921 near the Central Aguirre in flocks of fifteen to fifty birds. He observed it, July 22 and 29, 1923, on Guánica Bay. In the Carnegie Museum there are four skins, collected at Loiza on February 12, 1912, by W. W. Worthington. Danforth took one at Cartagena Lagoon June 3, 1924.

On Vieques Island Bowdish noted Wilson's plover on the beaches, sometimes in flocks that contained a dozen individuals, until December 1, 1899, and secured one on November 5. Richmond recorded them here on March 23, 1900, and collected three on March 27, which are in the U. S. National Museum. For Culebra the only record is that of a bird taken, February 11, 1899, by J. D. Milligan of the *Fish Hawk* expedition. Cassin reported several specimens secured by Robert Swift on St. Thomas, and there is a skin from this island in the U. S. National Museum. Cyrus S. Winch, collecting for C. B. Cory, obtained skins on Virgin Gorda and Anegada.

Wilson's plover is a small plover in which the male has a single black band across the chest, a black mark from the bill to the eye, and the forepart of the crown black behind a white forehead. In the female these marks are grayish brown. The species is distinguished from all of its allies by its large, heavy bill, which is two-thirds or more the length of the head.

### ***Oxyechus vociferus vociferus* (Linnaeus)**

#### Killdeer

*Charadrius vociferus* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 150. (Virginia and Carolina.)

*Aegialitis vociferus*, Cory, Auk, 1890, pp. 374-375 (Virgin Gorda, Anegada, specimens); Cat. West Indian Birds, 1892, p. 95 (Virgin Gorda, Anegada).

Virgin Gorda, Anegada; migrant in winter.

Four skins taken by Cyrus S. Winch from the two islands mentioned above have been borrowed for examination through the courtesy of the authorities of the Field Museum. Two males from Virgin Gorda taken December 13 and 15, 1889, have wing measurements of 165.0 and 160.00

mm. respectively. A male and a female from Anegada, shot December 20, 1889, measure 170.0 and 160.0 mm. All four are darker and browner above than the average of *O. v. rubidus*. They are identified as the North American form, present as winter migrants.

This bird should occur on Porto Rico as well.

### ***Oxyechus vociferus rubidus* Riley**

West Indian Killdeer, Playero, Playante, Pluvial Sabanero, Frailecillo Sabanero

*Oxyechus vociferus rubidus* Riley, Proc. Biol. Soc. Washington, April 17, 1909, Vol. XXII, p. 88. (Santo Domingo.)

*Hiaticula vocifera*, Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Charadrius vociferus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).

*Aegialitis vociferus*, Newton, Ibis, 1860, p. 307 (St. Thomas, specimen).—Cory, Cat. West Indian Birds, 1892, p. 95 (Porto Rico, St. Thomas).—Bowditch, Auk, 1902, p. 360 (Porto Rico, common).

*Oxyechus vociferus*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 162, 189; Anales Soc. Esp. Hist. Nat., 1878, p. 382 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152; Ornith., 1887, p. 450 (Porto Rico, resident).

*Oxyechus vociferus rubidus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 39-40 (Porto Rico, coastal plain); Auk, 1916, p. 411 (Vieques, specimens).—Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 103 (Porto Rico, Vieques).—Struthers, Auk, 1923, p. 472 (Guánica Lagoon, breeding).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 78-79 (Cartageha Lagoon).

Porto Rico and Vieques, resident, common; St. Thomas, recorded.

The West Indian killdeer, distinguished from all other plovers of this region by the two black bars across the anterior underparts, is separated from the North American form by smaller size and grayer coloration of the dorsal surface, with rufescent edgings to the feathers slightly more in extent. The usual statement that the West Indian form is darker is in error, since the bird of the mainland is distinctly darker and browner above. The wing in eight males that I collected in Porto Rico in 1912 ranges from 139 to 148.5 mm. (average, 145.3), and in six females from 139 to 153 mm. (average, 146.7). Winter collecting may reveal the northern bird as a migrant on Porto Rico, for the typical killdeer goes south regularly to Cuba (specimens in U. S. National Museum) and even to Jamaica (one skin examined). Possibly records for St. Thomas may pertain to migrants of the continental form.

In 1912 I found killdeer at Quebradillas, July 5; Manatí, July 7 to 11 (eight specimens); Río Piedras, December 22; Mameyes, February 9

(two specimens); Humacao, September 4; Yabucoa, May 8; Laguna de Guánica, May 26 (specimen); Cabo Rojo, August 30; Añasco, June 7 (three specimens); Utuado, August 3; Ciales, July 15, and Comerio, July 26 to 31 (specimen).

Struthers has recorded eggs taken at the Laguna de Guánica, May 9, 1921. A female that I collected at that point, May 26, 1912, was laying and I secured grown young with nestling down still adherent to the tail on June 7 at Añasco, and on July 8 near Manatí. In February at Mameyes killdeer were apparently mated. During the breeding season I found them usually about the dry open shores of lagoons near the coast; near Manatí numbers frequented the citrus groves between the town and the sea. In July killdeer appeared to wander inland along the valleys of the larger streams well within the confines of the foothills. At this season they appeared in the vicinity of Utuado, Ciales, Comerio and other towns of the interior, where they were seen on broad gravel bars in the streams. There is a specimen in the U. S. National Museum taken at Caguas, January 12, 1899, by A. B. Baker.

On Vieques Island one was seen in the section known as Martinez on March 16, 1912, and a pair was collected, March 23, near Isabel Segunda. The female was about to lay.

The killdeer is noisy and vociferous and attracts continual attention by its loud cries, particularly when its breeding haunts are invaded. At such times its reiterated calls may become monotonous and disagreeable to nerves jaded by the strain of long residence in the tropics. The birds run rapidly on the ground and often fall on the breast with outspread, tremulous wings to draw one away from the real vicinity of eggs or young. In fall and winter they become quieter and at this season are easily overlooked.

Analysis of its food has shown that the killdeer is a highly beneficial species, as it eats numbers of the immature mole crickets as well as other Orthoptera and many beetles. It is especially valuable because of its habit of feeding in fields and orchards.

#### ***Pluvialis dominicus dominicus* (Müller)**

American Golden Plover, Chorlito, Pluvial

*Charadrius dominicus* Müller, Natursyst. Suppl., 1776, p. 116. (Santo Domingo.)

*Charadrius aureus*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208 (Porto Rico).

*Charadrius pluvialis americanus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimens).

- Charadrius virginicus*, Newton, Ibis, 1859, pp. 255-256 (St. Croix; common fall migrant).—Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico, specimens); Journ. für Ornith., 1878, pp. 162, 189 (Arecibo, November); Anales Soc. Esp. Hist. Nat., 1878, p. 381 (listed).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens).
- Charadrius dominicus*, Cory, Cat. West Indian Birds, 1892, p. 94 (Porto Rico, St. Croix).—Mortensen, Atlanten, 1909, Vol. V, No. 66, pp. 647-648, Fig. 308; 1910, Vol. VII, No. 76, pp. 764-765 (St. Croix).
- Charadrius dominicus dominicus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 40 (Mameyes, seen).
- Pluvialis dominica dominica*, Struthers, Auk, 1923, p. 473 (Anegado Lagoon, specimen).

Porto Rico, St. Croix; migrant in fall.

Sundevall listed two specimens sent him by Hjalmarson, and Gundlach speaks of collecting the golden plover at Arecibo in November. Stahl had two specimens. F. A. Potts has written me that he recorded a bird on September 10, 1921, near Central Aguirre, and Struthers shot one from a flock of six at Anegado Lagoon, November 4, 1921. On February 16, 1912, I saw one on the beach at the mouth of the Río Mameyes but failed to secure it. This individual was probably a stray, as Porto Rico is supposed to be east of the regular line of spring migration.

On St. Croix Newton speaks of the golden plover as a fall migrant, often in large numbers; he noted the first arrivals on August 31, 1858. Mortensen states that they come at the end of August and the beginning of September. If the wind holds northeast, few are seen; but if it shifts to south or southwest, many are found on grassy plains, where they afford good hunting. Careful observation will reveal the species on other islands, since the fall flight regularly carries these birds south through this area.

The golden plover, a bird ten inches or more in length, will be confused only with the black-bellied plover. It differs from that species in having only three toes.

### ***Squatarola squatarola cynosurae* Thayer and Bangs**

American Black-bellied Plover, Pluvial, Pluvial Grande

- Squatarola squatarola cynosurae* Thayer and Bangs, Proc. New England Zool. Club, April 9, 1914, Vol. V, p. 23. (Baillie Island, Arctic America.)
- Squatarola helvetica*, Gundlach, Journ. für Ornith., 1878, pp. 162, 188-189 (San Juan, Porto Rico, specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 380 (San Juan, specimens).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 152 (Porto Rico, specimens).
- Charadrius squatarola*, Cory, Auk, 1887, p. 227 (Porto Rico); Cat. West Indian Birds, 1892, p. 94 (Porto Rico).

*Squatarola squatarola*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 40 (listed).

Porto Rico, rare visitant.

Gundlach records specimens of this plover taken at San Juan Bay; Stahl had two in his collection. Lately F. A. Potts has noted one near Central Aguirre on September 9 and 10, 1921, still in summer plumage, and a flock of six or seven, seen on several occasions during December, 1920, at Las Mareas near Salinas.

The species is distinguished from the golden plover by the presence of a fourth toe.

#### Subfamily ARENARIINAE

#### *Arenaria interpres morinella* (Linnaeus)

#### Ruddy Turnstone, Playero Turco

*Tringa morinella* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 249. (Coast of Florida.)

Ruddy Turnstone, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez); Oölogist, 1922, p. 177 (Western Porto Rico, common).

*Streptilas interpres*, Newton, Ibis, 1859, p. 256 (St. Croix, specimens).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 162, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 379 (Mayagüez, Cabo Rojo, Quebradillas, Vega Baja, winter visitant).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 151, 152 (Porto Rico, specimens); Ornis, 1887, p. 452 (listed).

*Arenaria interpres*, Cory, Cat. West Indian Birds, 1892, p. 92 (Porto Rico).

*Arenaria interpres morinella*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 40-41 (Porto Rico, Culebrita); Auk, 1917, p. 58 (Culebrita).—Struthers, Auk, 1923, p. 473 (Guanajibo Point, Porto Rico).

Porto Rico, St. Croix, Culebra, Culebrita; common in coastal areas during winter.

Gundlach found the ruddy turnstone at Mayagüez, Cabo Rojo, Quebradillas and Vega Baja, and states that it remains in Porto Rico from September to May. Other early collectors obtained specimens. I found a small flock at Punta Miquillo, on the coast north of Mameyes, February 15 and 21, 1912, and secured specimens, but I did not meet with it elsewhere. Struthers has recorded it especially from Guanajibo Point, south of Mayagüez, and notes that the latest observation was on May 7, 1921, and that the earliest in fall was on August 9, 1921. Danforth found the ruddy turnstone the most common shorebird along the salt water, and states that the last observation for 1922 was on May 4, in lagoons.



near Boquerón. F. A. Potts has observed it throughout the entire summer at Central Aguirre.

On St. Croix Newton recorded several in early April, 1857, and took two on September 8, 1858. In the U. S. National Museum there are two skins from Culebra Island, taken February 11, 1899, by A. B. Baker and J. D. Milligan, and I shot one from a flock of three or four on Culebrita Island, April 15, 1912.

The ruddy turnstone is partial to mud flats and bars exposed by the falling tides, but is also found on sandy beaches or about pools immediately behind them. In the West Indies it is seldom seen except on salt water. The species comes regularly and remains in small numbers throughout the winter, usually in little flocks. With further observation it will be recorded on other islands, as it is a common bird of widespread distribution.

The ruddy turnstone is about nine and one-half inches in length and in its winter plumage has the upper parts blackish, with the feathers bordered with brownish gray or ashy, the lower back white, and the tail white with a black band near the end. The breast is black variegated with white and the rest of the underparts are white. In breeding dress the upper parts are strikingly marked with rufous, black and white.

### Family SCOLOPACIDAE

#### Subfamily SCOLOPACINAE

#### *Capella delicata* (Ord)<sup>a</sup>

#### Wilson's Snipe, Becasina

*Scolopax delicata* Ord, Reprint of Wilson's Ornith., 1825, Vol. IX, p. cexviii. (Pennsylvania.)

Wilson's Snipe, Danforth, Oölogist, 1922, p. 177 (Porto Rico, winter).

*Scolopax gallinago*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Ricco, 1810, Vol. II, p. 208 (Porto Rico).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Scolopax wilsoni*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, specimens).

*Gallinago wilsonii*, Newton, Ibis, 1859, p. 258 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188 (Porto Rico; specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 368 (Porto Rico; winter).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico; specimens).

<sup>a</sup> The generic name *Gallinago* Koch, 1816, is antedated by *Capella* Frenzel, 1801. *Gallinago* has been accepted as valid in opinion 67 of the International Commission on Zoölogical Nomenclature, rendered before Frenzel's work was known, so that apparently it will require action on the part of the Commission to recognize *Capella* officially.

*Gallinago delicata*, Cory, Cat. West Indian Birds, 1892, p. 92 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 44-45 (Porto Rico; December).—Struthers, Auk, 1923, p. 473 (Laguna de Guánica).  
*Capella gallinago delicata*, Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 69 (Cartagena Lagoon, winter).

Porto Rico, common in migration, a few through winter; St. Croix, tolerably common in fall.

Gundlach reported the Wilson's snipe from September to spring in fair numbers. Hjalmarson sent five skins to Sundevall, from which, it would seem, he encountered the species in some abundance. On December 19, 1911, I found a dozen in short grass in a swampy locality about a small pool below Río Piedras, and collected one as a specimen. Another was flushed here at the border of a mangrove swamp on December 22. F. A. Potts (in litt. May 15, 1921) reports one or more seen near Central Aguirre at various dates from November 14, 1920, to March 12, 1921. Danforth, in western Porto Rico, reports it as a winter resident, at times abundant, arriving December 27, 1923, and October 7, 1924, and remaining in spring until March 22, 1922, and April 15, 1924, at Cartagena Lagoon.

Struthers noted the earliest arrival as August 29, 1921, and found it very common at the Laguna de Guánica, October 22, 1921. A few birds remained through the winter.

On St. Croix Newton found the species irregular in fall and reported one September 24, 1858.

From these records it appears that considerable numbers of Wilson's snipe migrate through the West Indies, apparently passing on to South America, since comparatively few remain to winter in Porto Rico.

The species is found about pools in the lowlands, often in areas where swampy meadows are covered with short grass. It frequents fresh-water swamps in the main and obtains its food by probing in soft mud. As one looks across an area of grassy swamp, it may appear wholly deserted, but as one steps forward, a long-billed snipe showing a dark back with distinct light stripes on either side, rises with a harsh call, perhaps from cover seemingly too scant to conceal it, and darts away with a twisting, turning flight that finally becomes straight, when the bird feels that it has placed sufficient distance for safety between itself and the cause of its alarm. For many days this may be one's only observation of the wary Wilson's snipe. Again, if conditions are proper in early morning or evening, one may see the birds walking about at the borders of pools. At such times their short legs, long bills and heavy bodies give them a somewhat grotesque appearance.

Everywhere this species is highly prized as a game bird because of the difficulty offered to the gunner by its twisting flight.

**Capella anthonyi** (Wetmore)

Porto Rican Snipe

*Gallinago anthonyi* Wetmore, Proc. Biol. Soc. Washington, December 30, 1920, Vol. 33, p. 78, Pl. 2, Figs. 1-2 (Cueva Catedral, near Morovís, Porto Rico); Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, pp. 311-314 (listed).

Porto Rico; extinct.

The Porto Rican snipe (Figs. 9 to 13), an extinct species, is known from bones collected by Mr. H. E. Anthony (in whose honor the species is named) among deposits in Cueva Catedral and Cueva Clara, near Morovís. It was a bird distinctly larger than the migrant Wilson's snipe, and apparently existed in the island within a short period of years, as many of the remains do not seem particularly ancient. It is known from the humerus, metacarpal, coracoid, tibio-tarsus and tarso-metatarsus.

Subfamily NUMENIINAE

**Phaeopus borealis** (J. R. Forster)

Eskimo Curlew, Chorlo, Curlis

*Scolopax borealis* J. R. Forster, Philos. Trans., 1772, Vol. LXII, p. 431. (Fort Albany, Hudson Bay.)

*Numenius borealis*, Gundlach, Journ. für Ornith., 1878, pp. 161, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 367 (near San Juan, specimen).—Stahl, Faun. Puerto Rico, 1883, p. 64 (listed).—Cory, Auk, 1887, p. 320 (Porto Rico); Cat. West Indian Birds, 1892, p. 94 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 41 (listed).

*Scolopax borealis* J. R. Forster, Philos. Trans., 1772, Vol. LXII, p. 431. (Porto Rico).

Porto Rico; casual.

Gundlach reports an Eskimo curlew sent to him from near San Juan by Blanco. There are no other records for the species, which, though formerly common, is now near extinction.

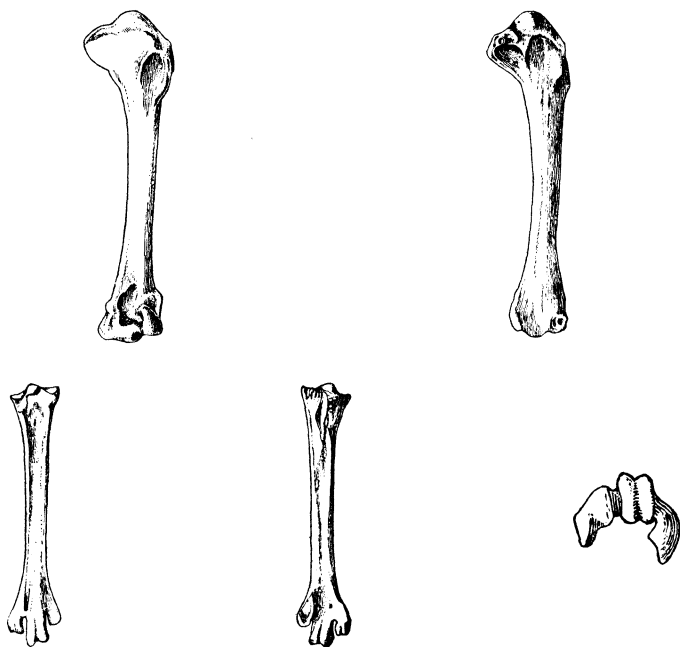
In my opinion this species is not separable generically from the Hudsonian curlew and its allies. It is distinguished from the species mentioned by smaller size.

**Phaeopus hudsonicus** (Latham)

Hudsonian Curlew, Chorlo, Curlis, Barga

*Numenius hudsonicus* Latham, Index Ornith., 1790, Vol. II, p. 712. (Hudson Bay.)

*Numenius hudsonicus*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico, in collection of Blanco); Journ. für Ornith., 1878, pp. 161, 187-188 (Mayagüez, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 367 (Punta Arenas, south of Mayagüez, specimen).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 150 (Porto Rico, specimens).—Cory, Auk, 1890, p. 374 (Anegada); Cat. West Indian Birds, 1892, p. 94 (Porto Rico, Anegada).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 41 (listed).



THE EXTINCT PORTO RICAN SNIPE (*Capella anthonyi*)

FIG. 9 (upper left).—Right humerus (type). Posterior view. About natural size. From cavern deposits of Cueva Catedral.

FIG. 10 (upper right).—Right humerus (type). Anterior view. About natural size.

FIG. 11 (lower left).—Right metatarsus. Anterior view. Natural size. From cavern deposits of Cueva Catedral.

FIG. 12 (lower middle).—Right metatarsus. Posterior view. Natural size. From cavern deposits of Cueva Catedral.

FIG. 13 (lower right).—Right metatarsus. Distal outline of trochlea. Twice natural size. From Cueva Catedral.

(These cuts are reproduced by courtesy of The American Museum of Natural History.)

Porto Rico, Anegada; rare during migration.

Gundlach reported a Hudsonian curlew in the collection of Blanco, and later on shot one at the mouth of a little stream at "Punta Arenas" south of Mayagüez. Stahl secured two, which were examined by Richmond in the collection at San Juan in 1900.

The only recent records for the species are those of F. A. Potts, who secured one on May 21, 1921, near Las Mareas, east of Salinas, and was fortunate in observing others from July 31 to September 24, 1921, near Central Aguirre. The specimen mentioned, which was sent to me for examination, has been generously presented by Mr. Potts to the U. S. National Museum and is preserved in its collections.

Winch secured one for Cory on the island of Anegada.

Large size and a strongly curved bill distinguish this curlew from any other shorebirds in this region.

**Bartramia longicauda** (Bechstein)

Upland Plover, Ganga

*Tringa longicauda* Bechstein, in Latham, Allg. Ueb. Vögel, 1812, Vol. IV, Pt. 2, p. 453. (North America.)

Upland Plover, Potts, Auk, 1927, pp. 120-121 (Guayama, Santa Isabel).

*Actiturus longicaudus*, Gundlach, Journ. für Ornith., 1881, p. 401 (Porto Rico, specimen); Journ. für Ornith., 1882, p. 161 (taken by Stahl).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimen); Ornis, 1887, p. 448 (listed).

*Bartramia longicauda*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 42 (listed).—Struthers, Auk, 1923, p. 473 (specimen).

Porto Rico; casual in migration.

The first specimen known from Porto Rico was secured by Stahl and placed on record by Gundlach. The only other notes for the species are those of F. A. Potts, who, in a letter written September 18, 1921, informs me that he saw one near Central Aguirre, September 10, and on September 13 shot another from a flock of fifteen in a wet pasture near Santa Isabel. This skin has been presented to the U. S. National Museum. Mr. Potts reports yet another seen, August 26, 1926, near Fortuna.

**Actitis macularia** (Linnaeus)

Spotted Sandpiper, Zarapico Mosqueado, Zarapico Manchado, Playero Manchado, Playero

*Tringa macularia* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 249. (Pennsylvania.)

Spotted Sandpiper, Danforth, Oölogist, 1922, pp. 10, 177 (western Porto Rico).

*Tringoides macularius*, Newton, Ibis 1859, p. 257 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 372 (Porto Rico; September to April).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico; specimens); Ornis, 1887, p. 449 (arrived end of August, 1886).

*Tringa macularia*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico; specimens).

*Actitis macularia*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico; specimen).—Cory, Auk, 1890, p. 375 (Tortola; specimen); Cat. West Indian Birds, 1892, p. 94 (Mona, Porto Rico).—Bowdish, Oölogist, 1900, p. 72 (Vieques); Auk, 1902, p. 360 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 41-42 (Porto Rico; common); Auk, 1916, p. 411 (Vieques); Auk, 1917, p. 58 (Culebra).—Struthers, Auk, 1923, p. 473 (Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 77 (Cartagena Lagoon).

Mona, Desecheo, Porto Rico, Vieques, Culebra, St. Croix, St. Thomas, Tortola; winter visitant, present in numbers throughout most of the year.

On Mona Island Bowdish reported the spotted sandpiper common from August 9 to 21, 1901, and collected an adult female in worn breeding dress on August 11 (in collection of U. S. National Museum). Mr. P. H. Struthers, in a letter dated March 3, 1922, reports one seen from January 22 to 24, 1922, on Desecheo Island—the first record of the species for that rock.

In Porto Rico proper this species is the most common shorebird, and is found alike on sandy beaches, mud flats, mangrove swamps, or the borders of streams and lagoons. Though most common on the coast and over the coastal plain, it extends inland within the line of the foothills to the base of the higher ranges, and probably follows casually along mountain streams through suitable sections, though not yet recorded above Caguas and Comerio, except for one bird seen by L. Stejneger on April 12, 1900, between Utuado and Adjuntas. In 1911 and 1912 I recorded it at Manatí, July 9; Bayamón, July 20 to 25 (specimen); Río Piedras, December 22 (specimen); Mameyes, February 9 to 29 (specimen); Humacao, September 3 to 9; Yabucoa, May 6 to 8; Patillas, May 13; Salinas, April 29 and May 2; Cabo Rojo, August 24 to 31 (specimen); Comerio, July 26 to 31; Caguas, January 8 and 10 (specimen); and forks of the Río Mameyes below Hacienda Catalina, March 6.

On Vieques Island Bowdish found it quite common from November to February, and I saw it there occasionally from March 16 to April 3, 1912. There is a specimen in the National Museum taken on Culebra Island, February 9, 1899, by A. B. Baker, and I noted the bird as common at this point from April 5 to 21 (specimen preserved April 9). On St. Croix Newton reported it as fairly common, and in 1858 noted that it was absent only from April 27 to July 27. Winch secured one on Tortola when collecting for Cory. The species unquestionably ranges through all of the islands concerned in the present report. The U. S.

National Museum formerly had a specimen from St. Thomas, received from John Akhurst, taxidermist (in 1863).

The spotted sandpiper is present in this region throughout most of the year, since in 1912 I noted the last for the spring near Patillas on May 13, and fall migration began with a bird recorded at Manatí on July 9. By July 24 the species was fairly common, and during August was present in numbers. It is found abundant through April, when it is in migration north, and stragglers (non-breeding individuals) remain much later. Struthers has recorded them throughout the summer. First arrivals in fall seem to be adults, and in 1912 I did not observe immature birds until July 27, after which they were common. Danforth reports the last at Cartagena Lagoon on May 23, 1924, and the first in fall on August 13, 1924.

The spotted sandpiper has the upper surface brownish gray with a faint greenish tinge. In summer dress the underparts are heavily spotted with dusky, while in immature birds and adults in winter plumage the undersurface is white.

The spotted sandpiper frequents the borders of small streams and ponds, where open bars of gravel or mud offer it feeding grounds, and delights to penetrate the darkest depths of mangrove swamps. There I have observed birds in shade so black that movement alone betrayed their presence. When watching for clapper rails in such situations, I have had the sandpipers walk quietly about within a few feet of me.

As the spotted sandpiper flies, it utters a low *peet weet* and scales off just above the surface of the water, showing a prominent light bar in either wing as the feathers are expanded. On land the body is kept in constant motion by the twitching of the posterior portion, so that the bird is never still. So incessant is this motion during the day that one wonders whether it is continued when the bird is asleep. Where the water is deep in the swamps, these sandpipers run about on the roots and arching stems of the mangroves, frequently several feet above the water.

### ***Tringa solitaria solitaria* Wilson**

Solitary Sandpiper, Zarapico Solitario, Solitario

*Tringa solitaria* Wilson, Amer. Orn., 1813, Vol. VII, p. 53, Pl. 58, Fig. 3.  
(Probably Pennsylvania.)

Solitary Sandpiper, Danforth, Oölogist, 1922, p. 177 (Lajas, Porto Rico).

*Totanus solitarius*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).—Cory, Cat. West Indian Birds, 1892, p. 93 (Porto Rico).

*Rhyacophilus solitarius*, Newton, Ibis, 1859, p. 257 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 372 (Porto Rico, September to April).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornis, 1887, p. 449 (listed).

*Helodromas solitarius*, Bowditch, Auk, 1902, p. 360 (Porto Rico).

*Tringa solitaria*, Bello, Zool. Gart., 1871, p. 350 (listed).

*Helodromas solitarius solitarius*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 42 (Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 75-76 (Cartagena Lagoon).

*Tringa solitaria solitaria*, Struthers, Auk, 1923, p. 473 (Porto Rico).

Porto Rico, St. Croix; winter visitant. The solitary sandpiper comes regularly to Porto Rico for the winter season. It is common and seemingly occurs in greater numbers in the western part of the island. In 1912 an immature female was taken on the Río de la Plata above Comerio on July 29. At Cabo Rojo the species was common from August 24 to 31, and a few were noted on the Río Humacao, below Humacao, from September 3 to 9. At present this is the only record for the eastern end of the island; I did not find it in that area when working there in the winter and spring. Struthers recorded it near Porto Real, from November, 1920, to May 7, 1921, while Danforth has reported it from Anegado Lagoon on March 4, 1922, and Cartagena Lagoon, August 30 to October 7, 1924. F. A. Potts has written me that at Central Aguirre it arrived from the north on July 31, 1921.

On St. Croix Newton found it fairly common, arriving July 26, in 1857, and August 5, in 1858. There is a specimen from St. Croix in the Museum of Comparative Zoölogy, collected by G. K. Noble on September 15, 1914.

Four skins that I have examined from Porto Rico (two in the National Museum and an old skin received from Stahl, in Cambridge, and the one taken by Noble on St. Croix, all represent the eastern subspecies.

The solitary sandpiper is in the main a bird of fresh water, and is found about ponds and streams in the lowlands. The only one that I observed inland for any great distance was taken on a gravel bar in the La Plata above Comerio, within the line of the foothills. Near Cabo Rojo I found the birds distributed in the lowlands about pools of water left after heavy rains, in newly plowed fields where there was standing water, or about the shallows of the coastal lagoons.

The species is active and sprightly in its movements and frequently calls when flushed. The white tail and barred under wing-coverts serve for identification in the field.



**Catoptrophorus semipalmatus semipalmatus** (Gmelin)

Willet, Chorlo

*Scolopax semipalmata* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 659. (New York.)

*Symphemia semipalmata*, Gundlach, Journ. für Ornith., 1878, pp. 161, 188 (Boquerón, San Juan Bay); Anales Soc. Esp. Hist. Nat., 1878, p. 369 (listed).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens).—Cory, Auk, 1890, p. 374 (Anegada, specimen); Cat. West Indian Birds, 1892, p. 94 (Porto Rico, Anegada).

*Symphemia semipalmata major* Stahl, Faun. Puerto Rico, 1883, p. 151. (Porto Rico, specimen; nomen nudum.)

*Catoptrophorus semipalmatus semipalmatus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 42 (listed).—Struthers, Auk, 1923, p. 473 (near Boquerón).

*Catoptrophorus semipalmatus longicaudis* Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 76. (Boquerón, type in Cornell University collection.)

Porto Rico, Anegada; present during winter in small numbers.

Gundlach secured this bird at Boquerón, and Stahl found it about San Juan Bay. Dr. Richmond has examined specimens in San Juan prepared by the latter collector. Struthers observed a flock of thirty south of Boquerón from November, 1920, to March 25, 1921, and recorded two on December 17, 1921. Gundlach's belief that the species may have nested in Porto Rico may have been in error, since the bird is known to come only as a winter visitant.

Winch, collecting for Cory, secured it on Anegada.

The willet is one of our larger shorebirds, distinguished by straight, rather heavy bill, grayish coloration, and wings prominently marked with black and white.

In two females taken at Boquerón, Danforth found the wing 172 and 191 mm., respectively, and the tail 81 mm. As the wing measurement of the second specimen is above the average for the eastern form, he proposes the subspecific name *longicaudis* tentatively. The matter is one that will require more specimens to establish. He found flocks of twenty-five at Boquerón, February 22 and March 8, 1924, and one bird at Cartagena Lagoon on September 23.

**Totanus flavipes** (Gmelin)

Lesser Yellowlegs, Chorlo, Caballero, Pata amarillo, Playante

*Scolopax flavipes* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 659. (New York.)

*Gambetta flavipes*, Newton, Ibis, 1859, p. 257 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 371 (Porto Rico, specimens).—Stahl, Faun.

Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornith., 1887, pp. 449, 450 (listed).

*Totanus flavipes*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).—Bello, Zool. Gart., 1871, p. 350 (listed).—Cory, Auk, 1890, p. 374 (Anegada); Auk, 1891, p. 47 (St. Croix); Cat. West Indian Birds, 1892, p. 93 (Porto Rico, St. Croix).—Bowditch, Auk, 1902, p. 360 (Aguadilla).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 42-43 (Cabo Rojo and Vieques Island).—Nichols, Auk, 1916, p. 320 (Guánica Lake).—Struthers, Auk, 1923, p. 473 (Porto Rico, winter).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 74-75 (Cartagena Lagoon.)

Porto Rico, Vieques, St. Thomas, St. Croix, Anegada; during migration and in winter.

Stahl has recorded the earliest arrival in his experience as August 9, 1886, when a flock was seen. Nichols observed a dozen at the Laguna de Guánica July 27, 1914, and Bowditch has recorded the species October 7, near Aguadilla. Struthers indicates that it is common during winter, recording its arrival in fall on August 1, 1921, and its departure in spring on April 9, 1921. Mr. F. A. Potts has written me that he has found it in flocks containing up to one hundred individuals from November to April on the flats between Central Aguirre and Santa Isabel. He reports the last observation in spring as April 10, 1921, and the first in fall as July 4, 1921, near Central Aguirre. Danforth found these birds common at Cartagena Lagoon, most common in October, when flocks of one hundred or more were seen. He reports that a few linger through the summer.

The only record for Vieques is a manuscript note by Richmond of a bird seen on March 25, 1900. On St. Croix Newton reported it July 26, 1857, and August 3, 1858. The U. S. National Museum formerly had a specimen from St. Thomas secured through J. Akhurst (catalogued in March, 1863). Winch collected a specimen on Anegada.

The lesser yellowlegs is found about the coastal lagoons or the fresher waters inland, but is reported only from the coastal plain. Like many other water birds, it is more abundant in the western part of Porto Rico, for conditions there are best suited to its needs. From August 24 to 31, 1912, I found it in small flocks near Cabo Rojo, feeding in overflowed lands near the lagoons or in plowed fields made soft by heavy rains. Individuals were observed flying from north to south and it appeared that they were in the height of their southward migration. Captain Cheney, of the sailing schooner *Francis H. Goward*, told me that one came aboard his ship about August 1, midway between Bermuda and Porto Rico.

The bright yellow tarsi differentiate the two yellowlegs from other shorebirds. The lesser species is distinguished by small size (wing, 149 to 163 mm.) The birds feed in the open, on bars or barren shores, where they are easily seen and often greet intruding man with their clear, whistled calls.

***Totanus melanoleucus* (Gmelin)**

Greater Yellow-legs, Playero, Chorlo, Caballero Chillon, Zarapico Blanquenegro, Playante

*Scolopax melanoleuca* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 659. (Chateau Bay, Labrador.)

Greater Yellowlegs, Danforth, Oölogist, 1922, p. 177 (Porto Rico, winter).

*Gambetta melanoleuca*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188; Anales Soc. Esp. Hist. Nat., 1878, p. 370 (Porto Rico, winter, specimens).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornis, 1887, pp. 449-450 (migration).

*Totanus melanoleucus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, winter).—Cory, Cat. West Indian Birds, 1892, p. 93 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 43 (Porto Rico).—Nichols, Auk, 1916, p. 320 (Guánica Lake).—Struthers, Auk, 1923, p. 473 (Porto Rico, winter).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 74 (Cartagena Lagoon).

Porto Rico, during migration and winter.

Stahl observed the greater yellowlegs on August 9, 1886, and records it as lingering late in spring. Nichols saw one at the Laguna de Guánica on July 27, 1914, and Struthers reports it as frequent in winter, with July 23, 1921, and March 19, 1921, respectively, as his earliest and latest dates.

Potts, at Central Aguirre (in a letter dated September 18, 1921), reports the earliest observation as August 12, 1921, and the latest in spring as May 15, 1921. Danforth noted the species near Boquerón until April 22, 1922, and states that a few remain at Cartagena Lagoon throughout the summer.

The species has not been recorded as yet from the Virgin Islands.

The greater yellowlegs has the habits and appearance of the lesser species, but is distinguished by greater size (wing, 180 to 199 mm.), while to a discriminating ear there is a slight difference in the calls of the two species. On May 2, 1912, I saw three of the greater yellowlegs at a shallow lagoon below Salinas and collected a male. One was noted at the Laguna de Guánica on the extraordinarily late date of May 26, while in fall the greater yellowlegs was recorded on mud flats near Porto Real on August 26. This species is usually less common than its smaller relative.

## Subfamily CALIDRINAE

***Pisobia minutilla* (Vieillot)**

Least Sandpiper, Zarapico Menudo, Zarapico Pequeño

*Tringa minutilla* Vieillot, Nouv. Dict. Hist. Nat., 1819, Vol. XXXIV, p. 466. (Nova Scotia to Antilles.)

Least Sandpiper, Danforth, Oölogist, 1922, p. 177 (Porto Rico, migration).

*Actodromas wilsoni*, Newton, Ibis, 1859, p. 258 (St. Croix).*Actodromas minutilla*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188 (Porto Rico, specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 376 (Porto Rico, winter).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornis, 1887, pp. 449, 452 (listed).*Tringa minutilla*, Cory, Cat. West Indian Birds, 1892, p. 93 (Porto Rico, St. Croix).*Pisobia minutilla*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 44 (Porto Rico).—Nichols, Auk, 1916, p. 320 (Guánica Lake).—Struthers, Auk, 1923, p. 473 (Porto Rico, Mona).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 71-72 (Cartagena Lagoon).

Mona, Porto Rico, St. Croix; present in migration, and on Porto Rico during winter.

Struthers has recorded two seen on Mona Island, July 15, 1921. Bowditch reported the species from that point in the Auk for 1902, page 360, but the specimen that he secured proves to be *Ereunetes pusillus*; his notes are, therefore, placed under that species.

In Porto Rico Stahl found the first arrivals of members of this species at the end of August, 1886, and believed that a few remained throughout the summer. One of his specimens is preserved in the Museum of Comparative Zoölogy. In 1912 I noted a least sandpiper at the Laguna de Guánica, May 26, and shot one at Joyuda, near Cabo Rojo, on August 28. Nichols found a dozen at the Laguna de Guánica, July 27, 1914. F. A. Potts writes me that flocks containing many individuals were found on the mud flats west of Central Aguirre during the winter of 1920-1921, and were still present at the date of writing, May 15, 1921. Though some may have been semipalmated sandpipers, a specimen collected was the present species. Danforth recorded the species near Boquerón through the winter until March 4, 1922, and at Cartagena Lagoon until May 30, arriving from the north July 5. Struthers reports it as seen in each month of the year, but more abundantly in September and May, when it is in migration.

On St. Croix Newton found it in autumn, and recorded the first arrivals in 1858 on August 19.

The least sandpiper ranges on the mud flats of the coast and the open lagoons of the coastal plain in company with others of its family. From the semipalmated sandpiper, which it resembles in tiny size, it is distinguished by the greenish tarsus and, in the hand, by the lack of webs between the toes.

**Pisobia melanotos** (Vieillot)

Pectoral Sandpiper, Zarapico Manchado

*Tringa melanotos* Vieillot, Nouv. Dict. Hist. Nat., 1819, Vol. XXXIV, p. 462. (Paraguay.)

Pectoral Sandpiper, Danforth, Oölogist, 1922, p. 177 (Porto Rico, migration).

*Actodromas maculata*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188 (Porto Rico, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 375, (Porto Rico, September to April).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornith., 1887, pp. 450, 452 (listed).

*Tringa pectoralis*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).

*Tringa maculata*, Newton, Ibis, 1859, p. 258 (St. Croix, specimens).—Cory, Cat. West Indian Birds, 1892, p. 93 (Porto Rico, St. Croix).—Bowdish, Auk, 1902, p. 359 (Aguadilla, specimens).

*Pisobia maculata*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 44 (Porto Rico).—Struthers, Auk, 1923, p. 473 (Laguna de Guánica).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 70-71 (Cartagena Lagoon).

Porto Rico, St. Croix; during migrations and occasionally in winter; most common during fall migration.

In Porto Rico Gundlach reported the pectoral sandpiper as a winter visitant from September to April, while Stahl, in discussing its migratory movement in the island, saw it late in spring and said that a few were found the year round—a statement to be taken with some reserve. Bowdish recorded it in western Porto Rico on September 26 and October 2, 1900. I noted a flock of a dozen near Guayanilla, August 24, 1912. F. A. Potts has written me that it was seen in the spring of 1921 near Central Aguirre until March 12, and arrived in the fall migration of that year on July 31. With his notes he forwarded a specimen to check his identification. Danforth reports its arrival at Cartagena Lagoon August 13, 1924, and found it at Anegado Lagoon until April 1, 1922. At Cabo Rojo Lighthouse he collected four on April 27, 1924. Struthers reports it as common at the Laguna de Guánica, October 22, 1921, and as seen occasionally during winter.

On St. Croix Newton recorded the pectoral sandpiper after September 14, 1858, and secured specimens.

The pectoral sandpiper, the largest of its group in this area, is found on mud flats and about pools in meadows. It is known only in the lowlands. The dusky-streaked breast, differentiated sharply from the white abdomen, and the greenish legs are excellent field characters. It may be found singly or in little bands. (For change in the scientific name from *Pisobia maculata* to *Pisobia melanotos*, see Wetmore, U. S. Nat. Mus. Bull. 133, 1926, p. 153.)

***Pisobia fuscicollis* (Vieillot)**

White-rumped Sandpiper

*Tringa fuscicollis* Vieillot, Nouv. Dict. Hist. Nat., 1819, Vol. XXXIV, p. 461. (Paraguay.)

*Tringa fuscicollis*, Bowdish, Auk, 1902, p. 360 (Aguadilla, specimen).

*Pisobia fuscicollis*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 44 (Porto Rico, Culebrita).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 71 (Cartagena Lagoon).

Porto Rico, Culebrita; found in migration.

The first record for Porto Rico is that of a female taken by B. S. Bowdish on the coast near Mayagüez, October 2, 1900 (data through the kindness of Mr. Bowdish). On April 15, 1912, I saw two birds on the north shore of Culebrita and shot one that fell in the sea and was swept away by strong tidal currents. Danforth has found the species uncommon at Cartagena Lagoon in fall, where in 1924 he recorded it from August 26 to October 20.

The bird is slightly larger than the least sandpiper and has greenish legs and a white rump, exhibited during flight.

***Limnodromus griseus scolopaceus* (Say)**

Long-billed Dowitcher

*Limosa scolopacea* Say, in Long's Exped., 1823, Vol. I, p. 170. (Near Council Bluffs, Iowa.)

*Macrorhamphus scolopaceus*, Cory, Auk, 1890, p. 374 (Anegada, specimen); Cat. West Indian Birds, 1892, p. 92 (Anegada).

*Limnodromus griseus scolopaceus* Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 202 (Anegada).

Anegada; casual migrant.

A specimen taken by Cyrus S. Winch, the only record for this bird, is, according to Cory, the long-billed form of the dowitcher.

***Micropalama himantopus* (Bonaparte)**

Stilt Sandpiper, Zarapico Zancudo

*Tringa himantopus* Bonaparte, Ann. Lyc. Nat. Hist. New York, 1826, Vol. II, p. 157. (Long Branch, New Jersey.)

*Ereunetes himantopus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico; specimens).

*Micropalama himantopus*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188 (Porto Rico, specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 373 (Porto Rico, migrant).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimen).—Cory, Cat. West Indian Birds, 1892, p. 92 (Anegada).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 44 (Porto Rico, specimen).—Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 206 (Porto Rico, Anegada).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 69-70 (Cartagena Lagoon).

Porto Rico, Anegada; in migration.

Gundlach reported the stilt sandpiper as arriving from the north in September, and says that he has found it at the borders of inland streams as well as at the coast. Stahl had a specimen in his collection. On August 28, 1912, I secured an immature female from two birds that came driving swiftly down the coast at Joyuda, near Cabo Rojo. Danforth reported it at Cartagena Lagoon from August 20 to September 27, 1924, and collected specimens. Cory records the species for Anegada.

In life the stilt sandpiper presents the general appearance of a small lesser yellowlegs, but may be distinguished by its longer legs, which are dull in color, not yellow. It is found about pools and mud flats and delights in wading in water nearly to its body.

### **Ereunetes pusillus** (Linnaeus)

Semipalmated Sandpiper, Zarapico Gracioso

*Tringa pusilla* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 252. (Santo Domingo.)

*Ereunetes petrificatus*, Newton, Ibis, 1859, pp. 257-258 (St. Croix).

*Tringa pusilla*, Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Ereunetes pusillus*, Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimens).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 188 (Porto Rico, specimens); Anales Soc. Esp. Hist. Nat., 1878, p. 374 (Porto Rico, winter).—Stahl, Faun. Puerto Rico, 1883, pp. 64, 151 (Porto Rico, specimens); Ornith., 1887, pp. 449, 450, 452 (Porto Rico, a few in summer).—Cory, Auk, 1890, p. 374 (Anegada, specimen); Cat. West Indian Birds, 1892, p. 93 (Porto Rico, Anegada).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 43-44 (Porto Rico, Mona).—Nichols, Auk, 1916, p. 320 (Guánica Lake).—Danforth, Auk, 1925, p. 562 (Cartagena Lagoon); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 72-73, Figs. 37-38 (Cartagena Lagoon, abundant).

*Tringa minutilla*, Bowditch, Auk, 1902, p. 360 (specimens, wrongly identified).

Mona, Porto Rico, St. Croix, St. Thomas, Anegada; common in fall migration.

There is in the U. S. National Museum a female taken by Bowdish on Mona Island, August 11, 1901.

In Porto Rico Stahl records the semipalmated sandpiper as arriving at the end of August, 1886, and remarks that it lingers late in spring, a few individuals remaining through the summer. A specimen that he collected is located in the Museum of Comparative Zoölogy. A specimen in the U. S. National Museum was taken by Bowdish near Mayagüez on September 23, 1901 (recorded by Bowdish erroneously, with the skin from Mona, as *Pisobia minutilla* and included in my previous account under that species). In 1912 I found the semipalmated sandpiper common on the mud flats of the coastal region near Cabo Rojo from August 24 to 31, and on August 26, 27, 28 collected five. Nichols observed two at the Laguna de Guánica, July 27, 1914. Danforth noted the species in flocks at Cartagena Lagoon from August 13 to October 20, 1924, and on August 20 estimated that 100,000 were present. He saw it also at Hormigueros and Boquerón. There are no definite winter records for the species.

Newton recorded it in fall on St. Croix, and states that in 1858 it arrived on August 14. Winch secured a specimen on Anegada. The U. S. National Museum in March, 1863, catalogued one from St. Thomas, received from the dealer J. Akhurst.

The species is an inhabitant of muddy shores about bays, lagoons and ponds in the coastal region. One of the smallest of its kind, it is distinguished from the least sandpiper, the only species other than *E. mauri* with which it may be confused, by its black tarsi and feet and by the distinct webs between the toes. The characters that distinguish it from *E. mauri* are indicated in the following account.

#### **Ereunetes mauri** Cabanis

##### Western Sandpiper

*Ereunetes mauri* Cabanis, Journ. für Ornith., 1856, p. 419. (Cuba.)

*Ereunetes mauri*, Danforth, Auk, 1925, p. 562 (Cartagena Lagoon, specimen); Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 73-74 (Cartagena Lagoon).

Porto Rico; casual in migration.

The only record is that of a female reported by Danforth taken from a flock of semipalmated sandpipers at Cartagena Lagoon, August 26, 1924.

The species is distinguished with difficulty unless specimens are in the hand, when it may be told from *E. pusillus* by its longer bill (which is as long as the tarsus or slightly longer, instead of shorter) and the greater proportion of rusty on the dorsal surface.



***Limosa fedoa* (Linnaeus)**

Marbled Godwit, Barga, Chorlo

*Scolopax fedoa* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 146. (Hudson Bay.)*Limosa*, Newton, Ibis, 1859, p. 257 (questionably on St. Croix).*Limosa fedoa*, Gundlach, Journ. für Ornith., 1878, pp. 161, 188 (near Boquerón, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 368 (Boquerón).—Stahl, Faun. Puerto Rico, 1883, p. 64 (listed).—Cory, Cat. West Indian Birds, 1892, p. 93 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 43 (listed).*Vetola fedoa*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 185 (Porto Rico).

Porto Rico; casual in migration.

The only known occurrence is that of a specimen taken near Boquerón and recorded by Gundlach.

The marbled godwit, distinguished by large size, brown plumage and slightly upward-curved bill, is accidental in this region, as its main migration route leads it farther to the west.

***Crocethia alba* (Pallas)**

Sanderling, Arenero

*Trynnga alba* Pallas, in Vroeg, Cat. Rais., 1764, Adumbr. p. 7. (Coast of North Sea.)*Calidris arenaria*, Newton, Ibis, 1859, p. 256 (St. Croix, specimen).—Gundlach, Journ. für Ornith., 1878, pp. 188 (specimen taken by Stahl); Anales Soc. Esp. Hist. Nat., 1878, p. 376 (Bayamón, taken by Stahl).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 151 (Porto Rico, 2 specimens); Ornith., 1887, p. 450 (listed).—Cory, Auk, 1890, p. 374 (Anegada, specimen); Cat. West Indian Birds, 1892, p. 93 (Porto Rico, Anegada).*Calidris leucophaca*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 43 (listed).*Crocethia alba*, Struthers, Auk, 1923, p. 473 (Añasco, specimen).

Porto Rico, St. Croix, Anegada; rare during migration, found occasionally during winter.

Gundlach lists a male taken near Bayamón by Stahl, who in the catalog of his collection cites two specimens, and in another place remarks that the sanderling lingers late in spring, so that he may have collected it at that season. Struthers recorded two on March 4, 1922, at the mouth of the Río Blanco near Añasco, and collected one. There are two specimens in the Carnegie Museum taken at Loiza, February 12, 1912, by W. W. Worthington.

Newton records a female taken on St. Croix, September 13, 1858, and Winch collected one on Anegada.

The sanderling, distinguished from other sandpipers by its very light color (in winter dress, the plumage ordinarily seen, it appears almost white), and lack of a hind toe, is found usually in little bands on sandy beaches or sometimes on mud bars. Its preferences are for salt-water habitats.

Family RECURVIROSTRIDAE

**Himantopus mexicanus** (Müller)

Black-necked Stilt, Viuda, Playante, Yegüita, Zancudo

- Charadrius mexicanus* Müller, Natursyst., Suppl., 1776, p. 117. (Mexico.)  
*Macrotarsus nigricollis*, Gundlach, Journ. für Ornith., 1874, p. 313 (Porto Rico, specimens in coll. Hjalmarson); Journ. für Ornith., 1878, pp. 161, 188 (Cabo Rojo, Boquerón, Arecibo); Anales Soc. Esp. Hist. Nat., 1878, p. 377 (Porto Rico; Puerto Real, Cabo Rojo, Boquerón, Río Arecibo).—Stahl, Faun. Puerto Rico, 1883, pp. 63, 151 (Porto Rico, specimens).  
*Himantopus nigricollis*, Newton, Ibis, 1859, pp. 258-260 (St. Croix, specimens).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 602 (Porto Rico, specimen).—Bello Zool. Gart., 1871, p. 350 (Porto Rico).  
*Himantopus mexicanus*, Cory, Cat. West Indian Birds, 1892, p. 92 (Porto Rico, Tortola, St. Croix).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 45 (Porto Rico, Vieques); Auk, 1916, p. 411 (Vieques).—Struthers, Auk, 1923, p. 473 (Laguna de Guánica, nesting).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 65-66, Figs. 34-36 (Cartagena Lagoon, breeding).

Porto Rico, resident; Vieques, St. Croix, Tortola, found formerly, possibly still present.

Gundlach in the seventies reported the black-necked stilt in Porto Rico at Puerto Real, Cabo Rojo, Boquerón and near the Río Arecibo.

On May 2, 1912, I found a small colony and collected two adult males in the lagoon region below Salinas, where the birds were breeding. On May 26 the species was fairly common at the Laguna de Guánica, and stilts were reported from Boquerón, but I did not find them in the course of my work in that vicinity. At Cartagena Lagoon Danforth noted the black-necked stilt from March or early April until October, but it was absent during the winter season. The birds began nest-building in May, placing their nests in a colony on little hummocks of grass or *Persicaria* and laying from five to seven eggs—an extraordinary number. The first sets were all taken by eggers. In a second attempt at nesting, begun at once, the birds spread over the marsh, concealing their nests in any available cover. These second sets contained from three to five eggs. The eggs were variable in color, the more usual type being buffy-clay, thickly spotted with rufous-brown and a few markings of lavender. Others were

olive-green spotted with chocolate. They varied normally from 1.72 x 1.25 inches (43.7 x 32.7 mm.) to 1.75 x 1.30 inches (44.4 x 33.0 mm.).

Struthers observed the stilt throughout the year at the Laguna de Guánica and found eggs and young on August 1, 1921.

A stilt was reported to Dr. Richmond on Vieques Island on March 24, 1900. Newton found the species in the fifties at Krausse's Lagoon on St. Croix, and Cory has recorded it from Tortola. It was probably resident formerly at these three points, but its present status in the smaller islands remains to be ascertained. I did not see it on Vieques in March, 1912. It is possible that it ranges through the small islands east of Porto Rico after the breeding season.

As one nears the breeding haunts of the stilt, birds with snow-white underparts and dark backs come flying overhead, uttering sharp barking calls, incessantly reiterated, as they circle about from side to side. Suddenly one alights in shallow water and stands half erect, with wings extended and waving rapidly, apparently in the greatest distress. One may forget their incessant clatter for a moment in marveling at the apparently disproportionate length of the extremely slender legs. Though appearing useless on land these stiltlike members come in good play when the birds wade in the shallows. It is there they seek their food, walking about in water at times nearly up to their bodies.

After the breeding season, old and young form little bands and feed and rest in quiet contrast to their noisy attitude when nesting. The few dates available indicate a somewhat irregular breeding period in Porto Rico, where the species is confined to a few lagoons offering extensive areas of shallow water and mud flats suitable as feeding grounds.

### Suborder LARI

#### Family LARIDAE

#### Subfamily LARINAE

#### **Larus atricilla** Linnaeus

Laughing Gull, Gaviota, Gaviota Forastera, Gaviota Boba, Gallego

*Larus atricilla* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 136. (Bahama Islands.)

Gulls, Knox, Hist. Acc. St. Thomas, W. I., 1852, p. 221 (listed).

*Chroicocephalus atricilla*. Newton, Ibis, 1859, pp. 371-372 (St. Croix, seen; St. Thomas, specimen).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 191 (Porto Rico, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 408 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 154 (Porto Rico, specimens); Ornith., 1887, p. 453 (Porto Rico, resident).

*Larus atricilla*, Moritz, Wieg. Arch. Naturg., 1836, p. 377 (Porto Rico, common).—Taylor, Ibis, 1864, p. 174 (Porto Rico, numerous).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (listed).—Cory, Cat. West Indian Birds, 1892, p. 82 (Porto Rico, St. Croix).—Bowdish, Auk, 1902, p. 357 (Porto Rico and outlying islands).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 45-46 (Porto Rico, Vieques, Culebra, Mona, Desecheo); Auk, 1916, p. 410 (Vieques); Auk, 1917, p. 58 (Culebra).—Struthers, Auk, 1923, pp. 473-474 (Porto Rico, Mona).

*Larus atricilla atricilla*, Wetmore, Auk, 1918, p. 338 (Desecheo).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 33 (Cartagena Lagoon, casual).

Mona, Desecheo, Porto Rico, Vieques, Culebra, Culebrita, St. Croix and St. Thomas; of regular occurrence but not known definitely to breed.

The laughing gull is found about the coasts and will unquestionably be listed for all of the islands concerned in this report, since it is a bird of strong flight that ranges regularly across channels of the sea. As the Virgin Islands all lie in a chain and those adjacent to each other are easily visible from either shore, there is no bar to visitation on the part of these birds.

Gundlach and Stahl recorded them as present through the entire year and Gundlach thought that they nested, but on analysis of his records it appears that he did not actually find them breeding.

Bowdish noted laughing gulls at Mona Island, August 9 to 21, 1901, and Struthers reported thirty there during July, 1921.

Bowdish found the species on Desecheo Island on June 24, 1900, and July 6 to 10, 1901, to the number of eight or ten pairs, but did not record their breeding. From June 13 to 16, 1912, I estimated that thirty birds were present. An adult male taken June 14 had the sexual organs somewhat enlarged, but was far from breeding condition.

In San Juan, Bowdish found that natives frequently had laughing gulls alive with one wing clipped to prevent escape, and that they sold them for food. He purchased one April 28, 1900. Struthers recorded them in Mayagüez harbor in the summer of 1921 from April 23 to August 17. Danforth has reported them in the same locality as early as March 10, 1922 (when six were observed), and has seen the bird casually at Cartagena Lagoon. In 1912 I recorded them in San Juan harbor, July 19 and 22 and August 1, and in the port at Aguadilla June 10 to 11.

I saw one in Port Mulas, on Vieques Island, April 22, and observed the first one on Culebra Island April 13, at Playa Sardine. On April 15 four or five were noted in Ensenada Honda, and I shot a male not yet in breeding condition near Culebrita Island. It may be mentioned that I

began observation on the bays at Culebra on April 5 and had both under daily observation from the little house in which I lived, but I did not see laughing gulls until more than a week after my arrival.

On St. Croix Newton reported seeing them. There is a male in the collection of the Museum of Comparative Zoölogy taken at St. Croix on September 25, 1914, by G. K. Noble. Newton reports one secured at St. Thomas.

All definite records for this gull—and the available data are scanty—pertain to the summer season, which may indicate that the birds segregate somewhere for breeding and subsequently wander. Breeding colonies probably occur somewhere among these islands, but are as yet unknown. Birds scolded me as I passed along the beaches of Desecheo, and from their behavior it seems possible that that is a nesting place.

The laughing gull, as the only gull of these waters, cannot be confused with any other bird. The adult is distinguished by the dark-hooded head, and adults and immature have the ends of the wings extensively black.

These gulls are seen in flight along beaches or cliffs in search for food; on Desecheo one or two came daily to examine refuse food thrown out from my camp. At times they circle high in air or again rest on buoys or other supports in the water. Their call is a loud *hah hah hah*.

Noble (Bull. Mus. Comp. Zoöl., August, 1916, Vol. LX, pp. 367-368) has separated a North American form of this gull as *Larus atricilla megalopterus* (Bruch) on the basis of larger size, giving a series of measurements to support his contention. Dwight (Bull. Amer. Mus. Nat. Hist., December 31, 1925, Vol. LII, pp. 266-267) has reviewed this question and has found from an independent series of measurements<sup>10</sup> that, though West Indian birds seem smaller, there is overlapping in size in both sets of birds that he has available. Among the specimens in the U. S. National Museum I note that most of the West Indian birds have short wings, but that occasional individuals have measurements as large as those of birds from North America. Though there may be two forms concerned, I believe that this can be established only when a series of birds from definitely known breeding colonies in the West Indies are available, since it is possible that the North American bird ranges in West Indian waters when not nesting. A male that I shot at Culebrita Island on April 15, 1912, has the wing 331.5 mm., while one from Desecheo taken June 14 measures 318.0. One from St.

<sup>10</sup> Measurements given by Mr. Ridgway in U. S. Nat. Mus. Bull. 50, Pt. 8, 1919, p. 637, pertain to North American birds only, as I have ascertained by consultation of his original sheets of measurements.

Kitts has the wing 294.0 mm., while in one from Jamaica it is 305.4. For the present the species is left undivided.

Subfamily STERNINAE

**Gelochelidon nilotica aranea** (Wilson)

Gull-billed Tern

*Sterna aranea* Wilson, Amer. Ornith., 1814, Vol. VIII, p. 143, Pl. 72, Fig. 6. (Cape May.)

*Gelochelidon nilotica*, Danforth, Auk, 1925, p. 558; Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 33 (Cartagena Lagoon, specimen).

Porto Rico; rare.

Danforth reports a female taken at Cartagena Lagoon, July 9, 1924, and remarks that others were seen during the summer from May 20 to September 3. They did not nest. The bird is distinguished from other terns by its heavier bill, which is black in color.

**Sterna hirundo hirundo** Linnaeus

Common Tern, Gaviota, Palomita

*Sterna hirundo* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 137. (Sweden.)

*Sterna hirundo*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 47-48 (Joyuda, specimens).—Struthers, Auk, 1923, p. 474 (western coast, Porto Rico).

Porto Rico; of regular occurrence on southwest coast, possibly breeding there.

On August 28, 1912, in the bay at Joyuda, near Cabo Rojo, a little band of these terns followed a school of mackerel hunting in the shallows behind the reefs. They dived excitedly when minnows were driven to the surface and, after hunger was satisfied, gathered in a close flock on rocks standing in water. I collected three, all adult males, which constitute the first record for Porto Rico. Struthers has reported the common tern as a summer visitor to the western coast of Porto Rico, where it was noted until October 29, 1921, arriving again on March 4 of the following year. It is possible the bird may breed somewhere near Cabo Rojo. The species is distinguished by the dark outer margin of the outer tail-feather and is distinctly larger than the roseate tern.

**Sterna dougallii dougallii** Montagu

Roseate Tern, Gaviota del Paraiso

*Sterna dougallii* Montagu, Suppl. Orn. Dict., 1813, text and plate (not numbered). (Cambræ Islands, Firth of Clyde.)

*Sterna*, Gundlach, Journ. für Ornith., 1874, p. 314 (Porto Rico, taken by Blanco).

*Sterna paradisaea*, Gundlach, Journ. für Ornith., 1878, pp. 163, 191; Anales Soc. Esp. Hist. Nat., 1878, p. 411 (San Juan, specimen).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 154 (Porto Rico, specimens); Ornis, 1887, p. 453 (September).

*Sterna paradisaea*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 47 (listed).

*Sterna dougalli*, Cory, Cat. West Indian Birds, 1892, p. 82 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 47 (Porto Rico).

Porto Rico; recorded from San Juan, Joyuda, Aguadilla and Manatí.

Notes given under *Sterna paradisaea* in my first list belong under the present species, as shown by reëxamination of the records, for *paradisaea* of Gundlach and Stahl refers to the roseate tern.

Gundlach was the first to record the present species from a specimen taken by Blanco near San Juan. Stahl had three specimens in his collection.

My first sight of the roseate tern in these waters was on June 16, 1912, when I encountered a small flock at sea between Desecheo and Aguadilla. The birds fed for a time by striking at small fishes in the usual tern fashion and then rested on the water in a close group.

On July 8, 1912, I found a few roseate terns flying along the curiously eroded limestone ledges that form the shoreline north of Manatí. Their note was a harsh *cack cack*. Two were shot, but one of these fell at sea and was lost. The one taken proved to be an adult female in somewhat worn plumage. This bird has the base of the bill (in the dried skin) dull orange and the tip black. On August 28 half a dozen roseate terns were found with common terns in the bay at Joyuda, near Cabo Rojo, where I collected a female in winter dress. In this bird the bill was wholly black.

From this occurrence in June and July it may be inferred that roseate terns nest in this area, but this still remains to be established. Those seen near Manatí acted as though nesting.

In summer adults have the crown black, while in winter the anterior third or more of the pileum is white. The bird is distinguished from the least tern by larger size and different head markings, and from the common tern by smaller dimensions and white tail.

#### ***Sterna anaetheta melanoptera* Swainson**

Bridled Tern, Gaviota

*Sterna melanoptera* Swainson, Birds W. Africa, 1837, Vol. II, p. 249. (West Africa.)

*Sterna anaethetus*, Bowditch, Auk, 1902, p. 357 (Mona, Desecheo).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 46 (Desecheo, Mona, Porto Rico); Auk, 1918, pp. 338-339 (Desecheo, specimens).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).

*Sterna anaetheta recognita*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 513 (Desecheo, Aguadilla).

Mona, Desecheo, breeding; Porto Rico, recorded from western coast.

The handsome, bridled tern, with sooty back and wings, black crown and forehead, and white underparts, was first recorded from this area by Bowdish, who found it breeding commonly on Mona and Desecheo. and reported it frequent on the western coast of Porto Rico. On Mona he noted it as abundant from August 9 to 21, 1901. On Desecheo, on June 24, 1900, the breeding period had only just begun, as three eggs found were nearly fresh. An incubated egg was collected on July 6, 1901.

In 1912 (during work from June 13 to 16) I estimated that fifteen hundred birds were present on Desecheo. Many were gathered on large rocks off shore, while others frequented the limestone cliffs and huge boulders of the main island. At this season many were nesting, though some apparently had not laid. Males stood on the rocks above incubating females and, as I approached, swooped at my head with angry cries. At a gunshot all those near rose in a swarm and circled in the air. The nests examined were in hollows on the tops or sides of huge blocks of limestone, in situations protected from the blazing rays of the sun. Some were placed out of sight, in holes eroded deep into the rock. The nests, each containing a single egg, were made of a few loose pebbles or rough stones gathered together, sometimes with the addition of a feather or two. Two eggs that I collected were badly incubated.

In the collections of the U. S. National Museum there are two eggs of the bridled tern from Desecheo Island, Porto Rico, one secured by Bowdish July 6, 1901, and the other collected by me June 15, 1912. The ground color in these is slightly brighter than pale olive buff, while over the entire surface are scattered dots and spots of warm sepia to walnut brown and burnt umber, mixed with spots and blotches of pale neutral gray. One of these eggs has the brown spots small; in the other they are large. These two eggs measure 49.0 x 34.2 mm. and 46.4 x 33.6 mm. respectively.

On the wing the birds were quick and graceful, and frequently in little groups darted swiftly out over the blue water to return to their perches later in a leisurely manner.

***Sterna fuscata fuscata* Linnaeus**

Sooty Tern, Gaviota Oscura

*Sterna fuscata* Linnaeus, Syst. Nat., ed. 12, 1766, Vol. I, p. 228. (Santo Domingo.)



- Onychoprion fuliginosus*, Newton, Ibis, 1859, p. 371 (between St. Thomas and St. Croix?).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 379 (St. Thomas, specimen).
- Haliplana fuliginosa*, Gundlach, Journ. für Ornith., 1874, p. 314 (listed); Journ. für Ornith., 1878, pp. 163, 191 (Porto Rico, specimen); Anales Soc. Esp. Hist. Nat., 1878, pp. 414-415 (Porto Rico, specimen).—Stahl, Faun. Puerto Rico, 1883, p. 66 (listed); Ornis, 1887, p. 453 (Porto Rico, specimen).
- Sterna fuliginosa*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte Croix et Porto Ricco, 1810, Vol. II, p. 209 (Porto Rico).—Taylor, Ibis, 1864, p. 172 (Tortola, eggs).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 603 (listed).—Cory, Cat. West Indian Birds, 1892, p. 83 (Porto Rico, St. Croix).—Bowditch, Auk, 1902, p. 357 (Mona).
- Sterna fuscata*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 46-47 (Porto Rico, Mona).—Struthers, Auk, 1923, p. 474 (between Mona and Porto Rico).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).

Mona; Porto Rico, found occasionally on north and south coasts; Tortola.

Bowditch noted the sooty tern as common on Mona Island from August 9 to 21, 1901. The species is supposed to breed there and the author in question speaks of an immature bird that dashed at night against the glass at the lighthouse. Struthers observed this tern, July 15, 1921, at sea between Porto Rico and Mona, and Gundlach found it on the north coast (in the month of July) and at Mayagüez. Gundlach reports a specimen taken by Blanco. Stahl remarks that he shot one on the southern shore of Porto Rico. In the bay at Joyuda I saw one with a flock of common terns on August 28, and near Rincón noted another in company with laughing gulls, September 2.

Alfred Newton believed that terns observed between St. Croix and St. Thomas toward the end of May were this species, and Cassin reports a skin from St. Thomas, taken by Robert Swift. In the market at St. Thomas, Taylor purchased half a dozen eggs said to have come from Tortola.

The species is distinguished from the bridled tern by slightly larger size and lack of white in the forehead. It usually breeds in large colonies. Where the ground is level these may cover several acres.

### ***Sterna albifrons antillarum* (Lesson)**

Least Tern, Gaviota Antillana

*Sternula antillarum* Lesson, Compl. OEuvres Buffon, 1847, Vol. XX, p. 256. (Guadeloupe Island, West Indies.)

*Sterna antillarum*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 163, 191 (Porto Rico); Anales Soc. Esp. Hist. Nat., 1878, p. 412 (San Juan, Río Toa).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 154 (Porto Rico, specimens); Ornis, 1887, p. 453 (migrant).—Cory, Cat. West Indian Birds, 1892, p. 83 (Porto Rico).—Bowdish, Auk, 1902, p. 357 (Cabo Rojo).—Wetmore, U. S. Dept. Agric. Bull. 326, p. 47 (listed).—Nichols, Auk, 1916, p. 320 (Laguna de Guánica).—Struthers, Auk, 1923, p. 474 (Cabo Rojo, breeding).

Porto Rico; reported breeding near Cabo Rojo lighthouse.

Gundlach included the least tern in his lists on the basis of a specimen taken by Blanco at San Juan, and of birds recorded by Stahl at the mouth of the Río Toa. The latter lists three specimens in his collection and considered them migrant, as he says that they appear in September. Bowdish recorded two off Cabo Rojo lighthouse August 22, 1901. Nichols saw one on the Laguna de Guánica, July 27, 1914, and Struthers, August 9, 1921, found twenty nesting on a sandy beach near the lighthouse at Cabo Rojo. This last report establishes the species definitely as resident in Porto Rico.

The least tern has the white breast, light-gray back and black crown of several other species, but is distinguishable from all by its tiny size. Hartert (Vög. pal. Fauna, February, 1921, Vol. II, Pts. 7-8, p. 1715) has included the North American forms as subspecies of the Old World *albifrons*. This is apparently correct, since *antillarum* is distinguished from *albifrons* only slightly by color and size.

***Thalasseus maximus maximus* (Boddaert)**

Royal Tern, Gaviota, Chirre, Gaviota Regia

*Sterna maxima* Boddaert, Tabl. Planch. Enl., 1783, p. 58. (Cayenne.)

*Sterna cayana*, Bello, Zool. Gart., 1871, p. 350 (listed).

*Sterna maxima*, Cory, Cat. West Indian Birds, 1892, p. 82 (Porto Rico, St. Croix, Anegada); Auk, 1890, p. 374 (Anegada, specimen).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 48 (Porto Rico, Vieques, Culebra); Auk, 1916, p. 411 (Vieques); Auk, 1917, p. 58 (Culebra, Culebrita).—Struthers, Auk, 1923, p. 474 (Rincón, Porto Rico, specimens).

*Thalasseus*, Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 379 (St. Thomas, young).

*Thalasseus regia*, Newton, Ibis, 1859, p. 371 (St. Croix, specimen).—Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 162, 191 (Mayagüez, specimen); Anales, Soc. Esp. Hist. Nat., 1878, p. 410 (Porto Rico, common).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 154 (Porto Rico, specimen); Ornis, 1887, p. 453 (listed).

Porto Rico, Vieques, Culebra, Culebrita, St. Croix, St. Thomas, Anegada; found throughout the year.

The royal tern, which frequents the coasts of Porto Rico and adjacent

islands in numbers, may be expected anywhere, but is more frequent in bays, since there its food of fish is more easily procured. In 1912 I found it on February 21 at Punta Picua, opposite Mameyes, where two were taken; in San Juan harbor, opposite Cataño, August 1; at the Mayagüez by Bowdish, who found it breeding commonly on Mona and Desecheo playa, June 6, and near Aguadilla, June 9 and 11. Gundlach shot it at Mayagüez, and Struthers secured two specimens near the Rincón light-house on June 22, 1921.

On Vieques Island I found royal terns occasional along the coast from March 16 to April 3, 1912, and on Culebra noted a few feeding with pelicans in the shallow bay at Playa Sardine (one taken) from April 5 to 21. Daily the birds crossed above the little village from the inner bay flying high in air, always attracting attention by their harsh calls. On April 15 a hundred or more were circling over a flat rock near Culebrita Island and may have been preparing to nest there. Newton received a specimen from St. Croix in 1854 and recorded others. Swift sent to Cassin a young tern from St. Thomas, that was probably this species, and Winch collected the species on Anegada.

These birds strike at fish in the water with dash and abandon. They are seen ordinarily flying back and forth over the quieter waters of bays, or resting, head on to the wind, on stakes or rocks standing in the water. They are harassed by frigate birds to some extent, but on occasion flocks band together and in turn put their tormentor to flight.

The species is the largest of the terns in this region, being almost as large as the laughing gull.

***Thalasseus sandvicensis acuflavidus* (Cabot)**

Cabot's Tern, Gaviota, Gaviota de Pico Agudo

*Sterna acuflavida* Cabot, Proc. Boston Soc. Nat. Hist., 1847, Vol. II, p. 257. (Tancah, Yucatan.)

Cabot's Tern, Danforth, Bird-Lore, 1924, p. 52 (Cartagena Lagoon).

*Thalasseus acuflavidus*, Gundlach, Journ. für Ornith., 1874, p. 314; Journ. für Ornith., 1878, pp. 163, 191 (Mayagüez, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 411 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 66, 154 (Porto Rico, specimens); Ornis, 1887, p. 453 (listed).

*Sterna acuflavida*, Bello, Zool. Gart., 1871, p. 350 (listed).

*Sterna sandvicensis acuflavida*, Cory, Cat. West Indian Birds, 1892, p. 82 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 48 (listed).

*Thalasseus sandvicensis acuflavidus*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 477 (Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, p. 34 (Cartagena Lagoon, casual).

Porto Rico; rare.

Gundlach recorded a specimen of Cabot's tern shot at Mayagüez, and supposed that it was common, while Stahl secured two for his collection. In the Museum of Comparative Zoölogy there is a specimen in winter dress from Bayamón, Porto Rico, taken by Dr. Stahl, probably one of the two just mentioned. The only recent record for the bird is that of Danforth, who reports one from Cartagena Lagoon, December 4 to 22, 1923.

The species apparently is rare. From other small terns it is distinguished by the extremely long and slender bill.

***Chlidonias nigra surinamensis* (Gmelin)**

Black Tern, Gaviota, Gaviota Negra, Gaviota Prieta, Gaviota Ceniza, Pitirre de Agua

*Sterna surinamensis* Gmelin, Syst. Nat., 1789, Vol. I, Pt. 2, p. 604. (Surinam.)

*Hydrochelidon fissipes*, Gundlach, Journ. für Ornith., 1874, p. 314 (reported); Journ. für Ornith., 1878, pp. 163, 191; Anales Soc. Esp. Hist. Nat., 1878, p. 413 (Porto Rico, specimen taken by Blanco).—Stahl, Faun. Puerto Rico, 1883, p. 66 (listed).

*Hydrochelidon nigra surinamensis*, Cory, Cat. West Indian Birds, 1892, p. 83 (Porto Rico).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 46 (listed).—Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 534 (Porto Rico).—Struthers, Auk, 1923, p. 474 (Cartagena Lagoon, specimens).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 34-35 (Cartagena Lagoon, fall).

Porto Rico; during migration.

Gundlach reported a specimen seen in the collection of Blanco in San Juan. This remained as the only record for many years. In 1921, however, Struthers observed twenty at Cartagena Lagoon from August 18 to September 10, and secured specimens. Danforth found it common at this locality from August 20 to October 7, 1924. The species is one found regularly only over fresh or slightly brackish marshes and ponds. In breeding dress the head and underparts are black, while in winter these areas are white. During migration many individuals in intermediate stage of plumage may be noted.

The black tern hunts for food on the wing, quartering steadily across its territory of water or marsh, dropping down to the surface to secure its prey of insects or small fishes. Its flight, like that of other terns, is exceedingly light and graceful.

***Anous stolidus stolidus* (Linnaeus)**

Noddy, Gaviota, Cervera

*Sterna stolidus* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 137. (West Indies.)<sup>11</sup>

<sup>11</sup> The type locality as here given is taken from the A. O. U. Check-list, 3rd ed., 1910, p. 47. Linnaeus, who described the bird from a specimen procured apparently through or by Magnus Lagerström, lists it as "Habitat in Americae Pelago."

*Anous stolidus*, Newton, Ibis, 1859, p. 371 (St. Croix?).—Gundlach, Journ. für Ornith., 1874, p. 314 (Porto Rico, specimen taken by Hjalmarson); Journ. für Ornith., 1878, pp. 163, 191 (taken by Hjalmarson and Blanco); Anales Soc. Esp. Hist. Nat., 1878, p. 415 (listed).—Stahl, Faun. Puerto Rico, 1883, p. 66 (listed).—Bowdish, AuR, 1902, p. 358 (Porto Rico, Desecheo, Mona).—Wetmore, Proc. U. S. Nat. Mus., 1918, Vol. LIV, p. 519 (kitchen-midden deposits, St. Thomas?).

*Anous stolidus stolidus*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 46 (Desecheo, Mona); Auk, 1918, p. 338 (Desecheo).—Schmidt, Field Mus. Nat. Hist., Zööl. Ser., 1926, Vol. XII, p. 151 (Mona).

Desecheo, Mona, breeding; Porto Rico, of random appearance along western and northern coasts; St. Croix and St. Thomas, of questionable occurrence.

Gundlach recorded the noddy tern from the north coast of Porto Rico and examined specimens in the collections of Hjalmarson and Blanco. Bowdish found it occasionally on the western coast of Porto Rico, and on June 16, 1912, I saw a number in the outer harbor of Aguadilla.

On Desecheo Island Bowdish saw it nesting in numbers on June 24, 1900, when the nest contents ranged from heavily incubated eggs to well-grown young, and on July 6 to 10, 1901, when young were abundant and only a few nests still contained eggs. From June 13 to 16, 1912, I found noddies abundant on Desecheo, and estimated that two thousand birds were then on the island, congregated in half a dozen principal colonies, with others still to come in from the open sea. The birds inhabited rocky ledges, where they gathered in groups that ranged from a few individuals up to five hundred. The single egg, deposited in some slight hollow of the rock, had a small collection of little, flat stones, a stick or two, and perhaps a feather arranged under it or about it as a nest. The adults flew about, calling harshly whenever I approached, some darting fiercely at my head and some remaining on the nest until I approached near enough to touch them. Above my camp was a colony of perhaps two hundred that was in continual bustle and confusion, as many birds were selecting their nesting sites, quarreling with birds already located, or examining suitable hollows with much nervous excitement. They were more or less active, both in flying about and calling, throughout the entire night. Their usual call is a harsh *kar-r-rk*, while a scolding note may be represented as *kwok kwok*. I secured four birds, one male and three females, all breeding. In the U. S. National Museum there is a further series of eight specimens from this island taken by Bowdish.

There are two eggs in the U. S. National Museum from Desecheo

Island, Porto Rico, collected by B. S. Bowdish on July 6, 1901. These have the ground color very pale buffy white, with scattered spots and blotches of warm sepia, walnut brown and burnt umber, interspersed with others of pale neutral gray. The markings are abundant about the larger end and are absent or scattered elsewhere. One of these eggs is elongated and the other more ovoid. They measure 49.0 x 35.5 mm. and 55.4 x 34.3 mm. respectively.

Bowdish records the noddy in numbers from Mona Island.

The occurrence of the species east of Porto Rico is uncertain. Newton thought that it came to St. Croix, and I have tentatively identified a fragmentary humerus from a kitchen midden at Magen's Bay, St. Thomas, as that of this bird.

The noddy is unmistakable in its sooty grayish-brown coloration and light gray, almost white, crown.

[Family RYNCHOPIDAE]

[*Rynchops nigra nigra* Linnaeus

Black Skimmer

*Rynchops nigra* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 138. (Coast of Carolina.)

*Rhynchops nigra?* Newton, Ibis, 1859, p. 371 (between St. Thomas and St. Croix).—Cory, Cat. West Indian Birds, 1892, p. 83 (St. Croix).

*Rynchops nigra nigra*, Ridgway, U. S. Nat. Mus. Bull. 50, 1919, Pt. 8, p. 452 (St. Croix).

Edward Newton states that "on June 14, 1858, between St. Thomas and St. Croix, a bird, I believe of this species, passed close to the vessel I was in; I could see its black back and white belly distinctly." This is the only basis for listing the species from St. Croix and is too uncertain to be accepted as definite. The skimmer, larger than the royal tern, is separated from all birds of similar form by the thin, laterally compressed, blade-like bill with the lower mandible projected prominently beyond the upper.]

Order COLUMBIFORMES

Suborder COLUMBAE

Superfamily COLUMBIDES

Family COLUMBIDAE

*Columba leucocephala* Linnaeus

White-crowned Pigeon, White-head, Paloma Cabeza Blanca, Viequera, Torcaza

*Columba leucocephala* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 164. (Bahama Islands).—Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-

Croix et Porto Rico, 1810, Vol. II, p. 208 (Porto Rico).—Taylor, Ibis, 1864, p. 171 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 600 (Porto Rico).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Cory, Auk, 1890, p. 375 (Virgin Gorda, specimen); Auk, 1891, p. 47 (St. Croix, specimen); Cat. West Indian Birds, 1892, p. 96 (Mona, Porto Rico, Virgin Gorda, St. Croix).—Bowdish, Auk, 1902, p. 360 (Mona, Mayagüez).—Struthers, Auk, 1923, p. 474 (Mayagüez, specimens).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).  
*Patagioenas leucocephalus*, Newton, Ibis, 1859, p. 253 (St. Croix).—Gundlach, Journ. für Ornith., 1874, p. 312; Journ. für Ornith., 1878, pp. 161, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 345 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 148 (Porto Rico, specimens).—Wetmore, U. S. Dept. Agric. Bull., 326, 1916, p. 53 (Porto Rico); Auk, 1916, p. 412 (Vieques, specimen); Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 213 (bones from cave deposits).—Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, pp. 310-311 (Mona, Porto Rico, Vieques, Virgin Gorda, St. Croix).  
 White-head, Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 640 (St. Croix).

Mona, Porto Rico, Vieques, Culebra, St. Croix and Virgin Gorda; formerly common, now lessened in numbers.

On Mona Island Bowdish found the white-crowned pigeon abundant from August 9 to 21, 1901, and on August 11 secured three specimens, which are in the U. S. National Museum. Cory also listed this species from Mona in his work published in 1892.

Gundlach, in the seventies, found the white-crowned pigeon common in Porto Rico, but in modern times it has decreased in numbers, probably through the cutting away of the forest growth that gives it shelter. On January 31, 1912, I saw one at the border of a field near Aibonito, but did not encounter the species elsewhere in the uplands. Near Mameyes from February 9 to 29 these doves were common in swampy forest near Punta Picua, where the growth of vegetation was so thick that it was difficult to observe them. They perch amid the thickest leaves and are hard to distinguish. Late in the afternoon numbers flew out to feed in more open growth on the fruit of the icaco (*Chrysobalanus*). Their flight is strong and they often make great sweeping circles. As they rose, their wings made a loud clapping sound, and they darted swiftly through the trees, keeping well behind cover. Adult females taken February 9 and 12 were preparing to breed, which controverts local belief that the birds nest on Vieques and come at certain seasons to the eastern coast of Porto Rico to feed on ripening wild fruits. They were known locally as "Viequera." One bird taken February 21, though fully grown, was in decidedly immature plumage. A few were recorded on July 9 in heavy brush about the Laguna de Manatí. Bowdish found

this species at Mayagüez, and Struthers mentions a pair taken in a citrus grove near that town on December 15, 1921.

A few bones of this species were identified in remains from a cave near Morovís.

On Vieques Island I found a number, March 25, in a strip of heavy swampy timber near Porto Ferro and collected a female. They were said to nest in this region and to range widely with the ripening of various wild fruits.

The Newtons, in the fifties, found the white-headed pigeon less common on St. Croix than the scaled pigeon. They report a young bird taken July 28, 1858, only a few days after leaving the nest. It must have been hatched on the island in spite of local belief that this dove comes from Porto Rico. Cory also reported the species from St. Croix and received it from Virgin Gorda in collections made by Winch.

The icaco, or beach plum, berries of various palms and other small fruits form its main food. The plumage of this pigeon in general is slaty gray, with the top of the head white more or less obscured by grayish. The present pigeon and the scaled pigeon have been segregated by some in a genus *Patagioenas*, but this I consider as only of subgeneric rank.

### ***Columba squamosa* Bonnaterre**

#### **Scaled Pigeon, Paloma Turca**

*Columba squamosa* Bonnaterre, Tabl. Enc. Méth., 1792, Vol. I, p. 234. (Guadeloupe Island, West Indies.)

*Columba*, Bowditch, Oölogist, 1900, p. 72 (Vieques, specimens).

*Columba portoricensis*,<sup>12</sup> Bello, Zool. Gart., 1871, p. 350 (Porto Rico).

*Columba corensis*, Moritz, Wiegmann, Arch. Naturg., 1836, p. 388 (Porto Rico).—Newton, Ibis, 1859, p. 252 (St. Croix).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, pp. 377-378 (St. Thomas, specimens).—Taylor, Ibis, 1864, p. 171 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, specimen).—Cory, Auk, 1891, p. 47 (St. Croix); Cat. West Indian Birds, 1892, p. 96 (Porto Rico, St. Croix).

*Columba squamosa*, Bowditch, Auk, 1902, p. 360 (Porto Rico, Mona).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 53-54 (Porto Rico, Vieques, Culebra, Mona, Desecheo); Auk, 1916, pp. 412-413 (Vieques); Auk, 1917, p. 59 (Culebra, specimen; Culebrita); Auk, 1918, p. 339 (Desecheo).—Struthers, Auk, 1923, p. 474 (Porto Rico, Mona).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).

*Patagioenas corensis*, Gundlach, Journ. für Ornith., 1874, p. 312; Journ. für Ornith., 1878, pp. 160, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 344

<sup>12</sup> Schlegel, Mus. Pays-Bas, Pt. 4, No. 35, 1873, p. 68, states that the type of *portoricensis* described by Temminck comes from Haiti, not from Porto Rico.



(Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 148 (Porto Rico, specimens).

*Patagioenas squamosa*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 314 (Porto Rico, St. John, St. Thomas, St. Croix).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 319 (bones from cavern deposits near Morovís).

Mona, Desecheo, Porto Rico, Vieques, Culebra, Culebrita, St. Croix, St. Thomas, St. John; fairly common, breeding on most if not all of the islands listed.

Bowdish found the scaled pigeon common on Mona Island from August 9 to 21, 1901, and Struthers reported it there in abundance in July, 1921. On Desecheo a fisherman who accompanied me reported seeing a pair of these pigeons occasionally from June 13 to 16, 1912, and said that on previous visits he had found them at times common.

In Porto Rico, in 1912, I found the species common in the hills and mountains, where small tracts of natural forest and extensive coffee fincas offered it shelter, but saw it seldom on the coastal plain, where there was in the main little shelter to attract it. I recorded it at Manatí, July 7 to 11 (adult female taken July 9); Río Piedras, December 16, 1911, to January 4, 1912; Mameyes, February 9 to 29 (adult males taken February 12 and 24); Yauco, May 27; Cabo Rojo, August 31; Maricao, May 29 to June 5 (adult male, May 31; young, June 1); Lares, June 18 to July 1; Utuado, August 3 to 9; Adjuntas, August 10 to 16; above Ciales, July 15; Aibonito, January 31; Comerio, July 26 to 31; El Yunque, March 2 to 11 (four males, March 6, 8 and 10). The dense forests covering the slopes of El Yunque de Luquillo, in the northeastern part of Porto Rico, harbored great numbers of these birds, which ranged commonly up to 2500 feet above the sea. In late afternoon and evening, near the Hacienda Catalina, it was a common sight to see them circling about high in the air. In spite of their large size, they were difficult to see in the trees, even in the thin foliage of the cacao rosetta (*Sloanea berteriana*). Thus it often happened that bird after bird flew out from amid the limbs, with loudly clapping wings, yet failed to offer a shot, while I peered vainly upward in search for their hidden companions. When one of the big males chanced to drop in near another, a great flapping of wings ensued until one was forced to take flight. The ordinary call note was a loud, strongly accented *who hoó hoo*, while a burring guttural *hoo-o-o-o*, given with a throaty rattle, was almost startling when heard from directly overhead. Many birds descended to feed amid the tall trees fringing small streams at the foot of the mountain, and some were encountered in the dense swampy forests

near Punta Picua, beyond Mameyes. Males rest and call at times in the tops of tall, dead trees.

It is a common belief in Porto Rico that the scaled pigeon is only a migrant on the island—a belief promulgated, it may be said, by gunners who desire an open season covering the entire year. That this is erroneous was proven on March 8, 1912, when without special search I found three nests on El Yunque, while there was no doubt whatever that the dozens of birds flushing on every hand were breeding. The three nests definitely located were made of sticks loosely piled together and placed about fifteen feet from the ground on horizontal limbs, or on refuse piled on large air plants. Two were empty, while one contained a single egg, plain white in color with a slight gloss, which was collected. This egg had had about five days' incubation. It measures 34.8 x 26.7 mm. At Maricao, on June 1, a native brought me a young bird about two-thirds grown, and said it was the only one in the nest. Gundlach has said that two eggs are laid, but from these instances it would seem that a single egg in a set is not unusual.

The paloma turca is said to occur in large flocks during fall, and to gather in numbers where wild fruits are ripening, at which time many are killed. It is common belief that these flocks are entirely migratory, but there can be no doubt that they come mainly from the forests on El Yunque and elsewhere in the interior.

Near Manatí I found the pigeons in dense bush about the Laguna de Manatí, and secured a female that was evidently breeding. At Río Piedras a few were seen in the small tract of forest above the Sugar Experiment Station. Elsewhere on the coastal plain they were noted casually below Yauco and near Cabo Rojo. In the U. S. National Museum are two specimens taken at Caguas, January 9, 1899, by A. B. Baker. Bones of this species were identified in cave deposits near Morovís.

On Vieques Island Bowdish reports taking three in 1899. An adult male, now in the U. S. National Museum collection, was secured March 28, 1900, by C. W. Richmond. I recorded one near Porto Ferro on March 25, 1912.

On Culebra Island an adult male was secured on February 2, 1899, by A. B. Baker. I shot one on April 10, 1912, in mangroves near the inner bay, and another was heard calling. It was said that the pigeons had been common here formerly.

The Newtons found the species in small numbers on St. Croix, and Cory has reported a specimen from the same island. Robert Swift forwarded a number from St. Thomas to Cassin, and in the U. S. Na-

tional Museum there is a male from St. Croix taken by F. A. Ober, with two more secured by the same collector in 1880 on St. John.

The scaled pigeon, which has the posterior part of the body slaty gray, like the white-headed pigeon, is distinguished by the reddish brown suffusion of the head, neck and anterior part of the breast, with squamations of deep reddish brown on the hind neck, from which the bird takes its name. It feeds on wild berries and fruits, with occasional succulent leaves or shoots. The berries of various palms, wild figs, the moral (*Cordia*), and jagua (*Genipa americana*), with various wild legumes, are eaten extensively.

The species is the only game bird of importance in the inland region of Porto Rico and affords excellent sport, as it is wary, strong on the wing, and is found only in the wildest, roughest country. It should be protected from February 1 to October 15 each year, if not longer, to permit it to breed, as otherwise it cannot maintain its status.

Though large numbers breed on Porto Rico, the scaled pigeon seems migratory to some extent between the various Antillean islands. I was told that the number to be found on Desecheo Island fluctuated greatly, and the Newtons, on St. Croix, report one, April 29, 1858, that, boys said, had just come in from the sea.

### ***Columba caribaea* Jacquin**

#### **Jamaican Band-tailed Pigeon**

*Columba caribaea* Jacquin, Beytr., 1784, p. 30 (Caribbean Islands).—Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto-Ricco, 1810, Vol. II, p. 208 (listed).—Hartlaub, Isis, 1847, p. 611 (listed).—Sundevall, Öfvers. Kongl. Vetensk-Akad. Förh., 1869, p. 601 (listed).—Gundlach, Anales, Soc. Esp. Hist. Nat., 1878, p. 346 (listed).—Cory, Auk, 1887, p. 110 (Porto Rico); Cat. West Indian Birds, 1897, pp. 97, 138 (Porto Rico).—Bowditch, Auk, 1902, p. 360 (listed).—Wetmore, U. S. Dept. Agric. Bull. 323, 1916, p. 54 (listed).

*Columba lamprauchen* Wagler, Syst. Av., 1827, p. 244. (Described from Porto Rico.)

*Columba caribbea*, Gosse, Birds of Jamaica, 1847, p. 296 (Porto Rico).

*Chloroenas caribaea*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 295 (Porto Rico?).

The position of this pigeon in the avifauna of Porto Rico is wholly uncertain. Wagler described it, under the name of *Columba lamprauchen*, from a bird ascribed to Porto Rico; Gosse informs us that "Mauge found it at Porto Rico, where it is said to associate in flocks of many hundreds." Other older authors apparently included the species in their lists because of these statements and there are no modern records for it.

On the basis of this information, the species is included here for the present, but it is my impression that the records noted are given with an erroneous locality, or that, if rightly assigned to Porto Rico, they refer to *Columba inornata exsul*, from which *caribaea* differs mainly in the plain, grayish brown head, neck and breast, with metallic sheen on hind neck and the prominent light bar across the end of the tail.

At the present time *caribaea* is known certainly only from the island of Jamaica.

***Columba inornata exsul* (Ridgway)**

Porto Rican Pigeon, Blue Pigeon, Paloma Sabanera

*Chloroenas inornata exsul* Ridgway, Proc. Biol. Soc. Washington, May 27, 1915, Vol. XXVIII, p. 106. (Porto Rico.) U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 299 (Utuado).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 55 (Porto Rico).

*Columba inornata*, Cory, Cat. West Indian Birds, 1892, p. 97 (Porto Rico).

*Chloroenas inornata*, Gundlach, Journ. für Ornith., 1874, p. 312; Journ. für Ornith., 1878, pp. 160, 185-186 (Lares, specimen); Anales Soc. Esp. Hist. Nat., 1878, p. 343 (Lares).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 148 (Porto Rico, specimen).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 318 (bones from caves, Morovís and Utuado).

Porto Rico; rare.

Gundlach obtained this pigeon only near Lares, in the vicinity of the Cueva Pajita. It was reported to him in the section known as Caguana, near Utuado, and was also said to occur in the mountains of the eastern part of the island. Stahl possessed one specimen, while I identified bones of this pigeon from cave material secured by H. E. Anthony in the vicinity of Morovís and Utuado.

The type specimen, in the U. S. National Museum, from the old Bryant collection, is without definite data. In the Museum of Comparative Zoölogy is a skin from the same source (Cat. No. 72,266), an adult bird with the wing 205 mm., tail 114.3 mm., culmen with cere 29.5 mm. and tarsus 30 mm. This bird bears out the characters assigned to the Porto Rican subspecies, as it is decidedly darker above and below than a specimen of *C. i. inornata* from Cuba, with wider edgings of white on middle and greater wing coverts.

The only recent specimen known to me is a female in the Carnegie Museum (No. 39,313) taken April 28, 1912, at Utuado, Porto Rico, by W. W. Worthington. This bird has the following measurements: wing, 209 mm.; tail, 128.5 mm.; culmen from base, 19.9 mm.; tarsus, 29 mm.

Nothing is known to me of the habits of this pigeon in Porto Rico. In appearance it is similar in a way to the scaled pigeon, but much paler,

with a vinaceous wash extending over the underparts and no squamations or metallic color on the hind neck.

Sportsmen were familiar with the name of this bird in 1912, but I failed to find it personally.

[*Crossophthalmus gymnophthalmos* (Temminck)]

Bare-eyed Pigeon

*Columba gymnophthalmos* Temminck, Pigeons, 1808-1811, Vol. I, second fam., p. 48, Pl. 18. (No locality cited.<sup>13</sup>)

*Crossophthalmus gymnophthalmos*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 322\* (St. Thomas, introduced?).

In the U. S. National Museum there is an excellent skin of an adult male of this species, marked "St. Thomas, W. I., A. D. Ormes." It bears no date, but was catalogued in 1874. The specimen is in good plumage and shows no evidence of having been in captivity.

As the natural habitat of the species is the arid Caribbean coast of Venezuela and Colombia, and the adjacent islands, and because of lack of substantiating information, I believe the locality given for this specimen to be erroneous.

It may be noted here also that Ledru has listed a green pigeon "*Columba sancti-thomae* Gm. les iles danoises," and that Knox, in his Historical Account of St. Thomas, W. I., published in 1852, records (page 221) a green pigeon from Porto Rico with the remark that "they visit the island at certain seasons, for the berries." These must be considered erroneous records.]

*Zenaida zenaida zenaida* (Bonaparte)

Zenaida Dove, Tortola Sanjuanera

*Columba zenaida* Bonaparte, Journ. Acad. Nat. Sci., Philadelphia, June, 1825, Vol. V, p. 30. (Florida Keys.<sup>14</sup>)

*Columba zenaida*, Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico, specimen).

*Zenaida amabilis*, Newton, Ibis, 1859, p. 253 (St. Croix, common).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas, specimens).—Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 312; Journ. für Ornith., 1878, pp. 161, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 346 (Porto Rico, specimens).—Stahl, Faun.

<sup>13</sup> So far as I have ascertained, no type locality has ever been cited for the present species.

<sup>14</sup> See Zoöl. Journ., 1827, Vol. III, p. 53, where it is stated that the species was described from a single specimen from the Florida Keys.

- Puerto Rico, 1883, pp. 62, 148 (Porto Rico, specimens).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, p. 640 (St. Croix).
- Zenaida zenaida*, Cory, Auk, 1890, p. 375 (Tortola, Virgin Gorda; specimens); Cat. West Indian Birds, 1892, p. 97 (Mona, Porto Rico, St. Croix, Tortola, Virgin Gorda).—Bowdish, Auk, 1902, p. 361 (Mona, Porto Rico).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, pp. 317-318 (bones from cavern deposits, Porto Rico); Auk, 1925, p. 446 (bones from kitchen midden, St. Croix).
- Zenaida zenaida lucida* Noble, Proc. New England Zool. Club, October 4, 1915, Vol. V, p. 101. (St. Croix; described as new).—Wetmore, U. S. Dept. Agric. Bull. 326, pp. 51-52 (Porto Rico); Auk, 1916, p. 412 (Vieques); Auk, 1917, p. 59 (Culebra, specimen; Louis Peña, Culebrita.); Auk, 1918, p. 339 (Desecheo).—Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 361 (Mona, Desecheo, Porto Rico, Culebra, Vieques, St. Thomas, St. John, Tortola, Virgin Gorda, St. Croix).—Struthers, Auk, 1923, p. 474 (Porto Rico, Desecheo; specimens).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 80-81 (Cartagena Lagoon).
- Columba carolinensis*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Ricco, 1810, Vol. II, p. 208 (Porto Rico, listed).—Hartlaub, Isis, 1847, p. 611 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (listed, after Hartlaub).
- Zenaidura macroura*, Cory, Auk, 1887, p. 112 (Porto Rico); Cat. West Indian Birds, 1892, p. 97 (Porto Rico).—Bowdish, Oölogist, 1900, p. 72 (Vieques, specimen); Auk, 1902, p. 361 (Porto Rico).
- Zenaidura macroura macroura*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 343 (Porto Rico?).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 52-53 (Porto Rico?).

Mona, Desecheo, Porto Rico, Vieques, Culebra, Louis Peña, Culebrita, St. Croix, St. Thomas, St. John, Tortola, Virgin Gorda; apparently resident throughout the islands enumerated.

Cory has listed this species for Mona, probably from specimens collected by W. W. Brown. Bowdish reported it common there from August 9 to 21, 1901, and in his manuscript notes (which I have seen) reports on August 11 a young bird in captivity.

On Desecheo, from June 13 to 16, 1912, I found *Zenaida* doves common in growths of West Indian birch and other shrubs that covered the arid slopes. Males called throughout the day, but were so wild that in the thick brush it was difficult to approach them, so that I was at much trouble to secure a single specimen. Scattered birds fed in small openings or along trails, and at low tide numbers were observed about pools of salt water left by the receding waters on the rough limestone of the shore. The one shot on June 15 was breeding. Struthers secured a specimen on Desecheo, January 22, 1922.

On Porto Rico the *Zenaida* dove is common and widely distributed

through the entire island. In 1912 I reported it as follows: Quebradillas, July 2 to 6; Manatí, July 7 to 11 (specimen); Bayamón, July 24 to 25; Mameyes, February 9 to 29 (five specimens); Yabucoa, May 3 to 10; Salinas, April 26 to May 2; Juana Diaz, August 17 to 22; Yauco, May 16 to 28; Laguna de Guánica, May 26 (specimen); Cabo Rojo, August 24 to 31 (specimen); Añasco, June 7 and 8; Lares, June 18 to July 1; Utuado, August 5 and 8; Adjuntas, August 12; Ciales, July 12 to 18; Aibonito, January 26 to February 5 (specimen); Comerio, July 26 to 31 (specimens); Caguas, January 5 to 14; Cayey, January 23. It is largely a bird of the cultivated valleys and lowlands, roosting in clumps of trees, coffee plantations, small areas of second growth, or mangroves, and flying out to feed in the fields and citrus groves during the morning and evening. The flight is strong and direct and it flushes with a loud clapping of wings. On the ground this species resembles the mourning dove, as it walks quickly about with nodding head, and it has a cooing note almost indistinguishable from that of the bird mentioned.

During the breeding season the males are frequently seen sailing out in circles, with the wings held stiffly, and their cooing notes come from the hillsides all day long. They are also observed at times walking rapidly about on the ground near the females, striking at each other with their wings. Breeding birds were taken in February and a young bird, not quite adult, but able to fly strongly, was collected near Manatí, July 8. Near Aguadilla Bowdish shot a female, May 28, 1900, that contained an egg nearly ready to be laid, and Struthers collected eggs during June, 1921. At Comerio, July 29, I took a female feeding young. Although in some localities the doves nest on the ground, nests in Porto Rico are usually placed in trees; otherwise the birds would not be able to hold their own against the mongoose. Danforth has reported two nests built in cat-tails at Cartagena Lagoon. Two eggs, white in color, constitute a set.

Between nine and ten in the morning the Zenaida dove comes in to streams or ponds for water, usually in pairs, swiftly flying high in the air. On the gravel bars of the larger rivers they walk about quickly, quenching their thirst and picking up bits of sand and gravel. Usually they are quite wary, but sometimes prefer to hide and let an intruder pass, rather than fly.

The species frequents open country and is thus the only one of the large pigeons in Porto Rico that prospers with the clearing of the land. In some localities it is hunted constantly, and then is very wild; elsewhere it is quite tame.

I found bones of this species common in cavern deposits near Morovís and Utuado.

The coloration of warm browns and grays and the dark spot on the side of the head are strongly suggestive of the mourning dove (*Zenaidura macroura*), a resemblance heightened by the cooing notes of the male that at a distance seem identical with those of the species mentioned. The Zenaida dove is easily distinguished, however, by the square-ended tail, as the mourning dove has the central tail feathers greatly elongated. It is probably this resemblance in color and note that has led to accounts of the mourning dove's presence in Porto Rico. Apparently the mourning dove does not range east of Santo Domingo, since I find no definite records of it for any of the islands under discussion. References pertaining to it are, therefore, placed under the Zenaida dove.

On Vieques Island the Zenaida dove was first recorded by Bowdish, who found it common and secured specimens on December 19 and 22, 1899. From March 16 to April 3, 1912, I noted it as very common in the dense scrubs covering the forested hills and in brush-grown pastures. This was apparently the height of the breeding season, and males were cooing constantly. It was said that flocks gathered in May and June to feed on the fruit of the palo blanco (*Drypetes* sp.) Specimens in breeding condition were preserved on March 25 and 27.

On Culebra Island Zenaida doves were fairly common from April 5 to 20, 1912, and an adult male (breeding) was taken on April 11. The species was noted also on Louis Peña and Culebrita islands.

The Newtons found the Zenaida dove very common on St. Croix, and recorded it as nesting in trees from April to the end of July, with two eggs constituting a set. G. K. Noble secured an adult male here, September 15, 1914, and I have identified bones of this species from a kitchen midden on the Richmond estate, near Christiansted, in material presented to the U. S. National Museum by Mrs. Hugo Hark.

The species was first collected in St. Thomas by Robert Swift in the late fifties. One of his skins is preserved in the U. S. National Museum, with another taken by F. A. Ober in 1880. The latter collector secured a female during the same year on St. John, and skins were sent to Cory by Winch from Tortola and Virgin Gorda.

Noble described the bird from St. Croix as a subspecies under the name of *Zenaida zenaida lucida*, distinguished by the brighter brown color of the head—a form that has been said to range from Porto Rico to Antigua in the Lesser Antilles. On examination of a series, including the type of *lucida* (seen in the Museum of Comparative Zoölogy), I find



no basis for separation of these birds as a distinct race, since the supposed differences appear to be wholly individual. There is considerable variation in depth of color throughout the entire range of the typical form.

The bulk of the food of this dove consists of seeds, including many wild legumes, euphorbias, mallows, knotweed and pigweed. Waste grain is also taken and various small wild fruits in season. The species is a valuable game bird and should be carefully protected during the breeding season.

***Zenaida aurita* (Temminck)**

Martinique Dove

*Columba aurita* Temminck, Les Pigeons, Vol. I, 1808-1811, p. 60, Pl. 25. (Martinique.)

*Zenaida martinicana*, Cory, Auk, 1891, p. 48 (St. Croix, specimen).

*Zenaida castanea*, Cory, Cat. West Indian Birds, 1892, p. 97 (St. Croix).

*Zenaida aurita*, Ridgway, U. S. Nat. Mus. Bull. 50, Pt. 7, 1916, p. 364 (St. Croix, Virgin Gorda).

St. Croix. Virgin Gorda.

Cory reports a specimen of this bird from St. Croix collected in March or April, 1890, by Cyrus S. Winch. Mr. Ridgway has examined an adult female from Virgin Gorda in the collection of the Field Museum, but did not see the skin attributed to St. Croix. The species, primarily distributed in the Lesser Antilles, is readily distinguished from the similar *Zenaida* dove by the white of the posterior underparts, which contrasts conspicuously with the brown of the anterior portions.

***Chaemepelia passerina trochila* Bonaparte**

Porto Rican Ground Dove, Rola, Rolita, Tortolita

*Chaemepelia trochila* Bonaparte, Consp. Gen. Av., 1855, Vol. II, p. 77. (Martinique.)

Porto Rican Ground Dove, Danforth, Bird-Lore, 1922, p. 41 (Mayagüez).

*Columba passeris*, Knox, Hist. Acc. St. Thomas, W. I., 1852, p. 221 (St. Thomas).

*Columba passerina*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Rico, 1810, Vol. II, p. 39 (St. Thomas).—Bryant, Proc. Boston Soc. Nat. Hist., 1866, p. 257 (Porto Rico).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (Porto Rico).

*Columbigallina passerina*, Cory, Auk, 1890, pp. 374, 375 (Anegada, Tortola, Virgin Gorda, specimens); Auk, 1891, p. 48 (St. Croix); Cat. West Indian Birds, 1892, p. 97 (Porto Rico, Tortola, Virgin Gorda, Anegada, St. Croix).—Bowditch, Oölogist, 1900, p. 72 (Vieques); Auk, 1902, p. 361 (Porto Rico).—Hartert, Nov. Zoöl., 1902, Vol. IX, p. 276 (St. Thomas).

*Chaemepelia trochila*, Newton Ibis, 1859, pp. 253-254 (St. Croix).—Cassin, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 378 (St. Thomas).—Mortensen, Atlanten, 1909, Vol. VI, No. 66, pp. 640-641, Fig. 303 (St. Croix).

- Chaemepelia passerina*, Bello, Zool. Gart., 1871, p. 350 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 349 (Porto Rico).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 149 (Porto Rico).—Ridgway, Proc. U. S. Nat. Mus., 1884, Vol. VII, p. 172 (St. Thomas, specimens).—Nicoll, Ibis, 1904, p. 576 (St. Thomas, St. Croix).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 317 (bones from caves, Porto Rico).
- Chaemepelia passerina trochila*, Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 49-51 (Porto Rico, Vieques, Culebra); Auk, 1916, pp. 411-412 (Vieques, specimens); Auk, 1917, p. 59 (Culebra, Culebrita, Louis Peña, specimens).—Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 413 (St. Croix, Anegada, Virgin Gorda, Tortola, St. John, St. Thomas, Culebra, Vieques, Porto Rico).—Struthers, Auk, 1923, p. 474 (Porto Rico).—Danforth, Journ. Dept. Agric. Porto Rico, 1926, Vol. X, pp. 81-83, Fig. 39 (Cartagena Lagoon).
- Chamaepelia portoricensis* Lowe, Ibis, 1908, p. 108. (Described as new, type locality, Guánica, Porto Rico.)

Porto Rico, Vieques, Culebra, Culebrita, Louis Peña, St. Croix, St. Thomas, St. John, Tortola, Virgin Gorda and Anegada; found universally wherever conditions are suitable for it.

In 1911 and 1912 I recorded the ground dove at Quebradillas, July 2 to 6; Manatí, July 7 to 11 (specimens); Río Piedras, December 16 to January 4; Mameyes, February 9 to 29 (specimens); Humacao, September 3 to 9; Maunabo, May 11; Salinas, April 26 to May 2 (specimens); Juana Diaz, August 17 to 22; Yauco, May 16 to 28 (specimens); Cabo Rojo, August 24 to 31; Mayagüez, June 6; Aguadilla, June 9 to 12; Lares, June 24; Utuado, August 3 to 9; Ciales, July 12 to 18; Comerio, July 26 to 31; Cayey, January 19 (specimen); Caguas, January 5 to 14; and Hacienda Catalina, March 2 to 11. On Porto Rico the species is restricted mainly to the coastal area below an altitude of five hundred feet, but follows inland along the courses of the streams and occasionally ranges up to twelve hundred feet, as at Cayey and Lares, where a few were seen. With increased clearing they may spread to higher altitudes. Ground doves occur in plowed fields, on stony hill-sides, pastures, and open country in general. They walk about quickly on the ground with long steps and rapidly nodding heads, picking up food and gravel as they go. Before an intruder they travel rapidly away, raising the tail nervously, or crouch to the ground, to rise with a sudden flutter of wings that exposes the reddish brown under surface of the remiges, as they dart swiftly away. When several rise at once, there is considerable confusion, as the birds zigzag back and forth, crossing and recrossing one another's line of flight. After flying a short distance they

drop to the ground again or perch in rather open trees, sitting close together. When alarmed, they sidle quickly along the limbs, hiding behind them, or suddenly take flight and whirl swiftly away. The males have a loud note, *coo-coo-coo-coo*, given as they perch in the trees; during the summer these notes come from every side, as the birds answer back and forth. The males also sail out in short circles with the wings stiffly spread—an action like the similar display of the mourning dove. At such times they have a curious kitelike appearance. The birds are usually found in pairs, though occasionally, before or after the breeding season, they are encountered in small flocks.

The breeding season appears to extend from the first week in March until the last of August. Nests observed in Porto Rico were usually slight and flimsy, so that in many cases the eggs could be seen from beneath. Two eggs, white in color, form a set, and at least two broods are reared in a season, with apparently a third one at times.

Struthers reports eggs taken May 7, 1921, near Guanajibo Point. At Yauco and Guánica in 1912 the latter half of May appeared to be the height of the breeding season. One nest near Yauco was placed six feet from the ground, on the slanting limb of a calabash tree. On May 20 I found a young bird on the ground which had fallen from a nest in a tree above. This bird, only a few days old, still had the egg tooth, though the wing quills had begun their growth. It was covered rather sparingly with wiry down buffy white in color. At Manatí during early July I found flocks composed of grown young, while adults were busy with a second brood. A female taken contained an egg ready for the shell. From August 17 to 22 grown young were abundant at Juana Diaz. The calling of the males lessened perceptibly in August, though they were heard occasionally into September.

Bowdish found a nest with fresh eggs near San Juan July 19, 1899, placed twelve inches from the ground in a dead bush. At Aguadilla one seen June 9, 1900, was eight feet from the ground, on the horizontal branch of a mango tree; one noted June 24 was placed on a stump amid sprouts, nine feet from the ground; one observed July 12 was two feet from the ground and contained fresh eggs, and one, July 22, was twelve inches above the earth in a thorn bush and it, too, had fresh eggs. An egg in the National Museum taken by Bowdish in Porto Rico (without definite data) is white with a faint gloss and measures 21.1 x 16.3 mm.

A number of bones of this species were encountered in cavern deposits near Morovís, in material collected by H. E. Anthony.

While females were incubating, males were found feeding together.

often in yautia or cane-fields. When caring for their young, females feed in the early morning, filling the crop with seeds, and then about nine fly to water, usually following well-defined routes across the slopes of the hills. After drinking, they perch quietly in the trees, and in a short time the "pigeon's milk" begins to form as a thick curd, in the lower portion of the crop. After June it was a common sight to find flocks of a dozen or more young gathered by themselves. Formerly the birds were said to have nested on the ground, but now they build almost entirely in trees to escape the mongoose.

This species is one of the few that is found in the cane-fields, where it occurs regularly, even when the cane is well grown, either in the roads leading through the fields or between the rows. These doves are very timid and show great fear of sparrow hawks, sometimes refusing to fly when the latter are in the neighborhood. During the breeding season the males were found in the early morning feeding in the cane-fields or else cooing from the hills, while the females were above on the hillsides. When there was a heavy dew, the birds were inactive until the ground became dry, at ten or eleven in the forenoon:

On Vieques Island this dove was common and universally distributed in pastures and cane-fields. On March 30, 1912, I flushed a male from a nest containing two eggs in which incubation had just begun. The nest was placed seven feet from the ground on the horizontal limb of a tree, and was a deep, cupped structure, containing much more material than is usual in the nests of doves.

On Culebra Island the ground dove was one of the most abundant birds, probably because here the mongoose is absent. The doves spread also to the small islands of Louis Peña and Culebrita.

On St. Croix the Newtons found them very common, and noted their nests on the ground, in bushes, sugar cane or trees. They described the nest as a large, well-built structure. In the Museum of Comparative Zoölogy there is a series of eight skins, secured in June and September, 1914, by G. K. Noble, that appear identical with birds from Porto Rico and St. Thomas. Nicoll found them abundant here from February 19 to 21, 1904. The species is plentiful on St. Thomas and has been observed and collected there by many naturalists. Benedict and Nye secured nine skins for the U. S. National Museum from January 17 to 24, 1884, and specimens have been taken by Robert Swift, Hartert and Nicoll.

Cyrus S. Winch collected specimens for Cory on Anegada, Tortola and Virgin Gorda, while Ridgway lists skins from St. John.

Practically the entire food of the ground dove is composed of seeds, as in seventy-two stomachs that I examined minutely there occurred only a few fragments of ants and occasional individuals of the spherical scale insects known as ground pearls, all probably taken by accident. Weed seeds constituted about one-fourth of the mass.

***Chaemepelia passerina exigua* (Riley)**

Mona Ground-Dove

*Columbigallina passerina exigua* Riley, Proc. U. S. Nat. Mus., 1905, Vol. XXIX, p. 171. (Mona Island.)

*Columbigallina passerina*, Cory, Cat. West Indian Birds, 1897, p. 97 (Mona).—Bowdish, Auk, 1902, p. 361 (Mona).

*Chaemepelia passerina exigua*, Todd, Ann. Carnegie Mus., May 8, 1913, Vol. VIII, pp. 571-573 (Mona).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 51 (Mona).—Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 420 (Mona).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).

Mona Island; resident.

The ground dove of Mona Island is a form distinct from that on the adjacent island of Porto Rico, distinguished by paler coloration. The subspecies *exigua* is found also on the island of Inagua, in the southern Bahama Islands.

Bowdish, who collected the type and two additional specimens now in the U. S. National Museum, reported these doves common on Mona from August 9 to 21, 1901. He found a nest containing two partly incubated eggs, three feet from the ground, in a bush, August 11, and also found a single fresh egg on the bare rock in a path. The two eggs mentioned in the collections of the U. S. National Museum are white with a slight gloss, and measure 21.2 x 16.4 mm., and 21.4 x 16.2 mm. respectively.

***Oreopeleia montana* (Linnaeus)**

Ruddy Quail-dove, Perdiz, Perdiz del Monte, Boyero

*Columba montana* Linnaeus, Syst. Nat., ed. 10, 1758, Vol. I, p. 163. (Jamaica.) Ruddy Quail-dove, Struthers, Auk, 1923, p. 474 (listed).

*Columba montana*, Moritz, Wieg. Arch. Naturg., 1836, p. 389 (listed).—Bryant, Proc. Boston Soc. Nat. Hist., 1866, Vol. X, p. 257 (Porto Rico, specimen).—Sundevall, Öfvers. Kongl. Vetensk.-Akad. Förh., 1869, p. 601 (listed).

*Geotrygon montana*, Taylor, Ibis, 1864, p. 171 (Porto Rico).—Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 348 (Mayagüez and interior, specimens).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 148-149 (Porto Rico, specimens).—

Cory, Cat. West Indian Birds, 1892, p. 97 (Porto Rico, St. Croix).—Bowdish, Auk, 1902, p. 361 (Mona, Aguadilla, Vieques).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, pp. 48-49, (Porto Rico); Auk, 1916, p. 411 (Vieques).—Schmidt, Field Mus. Nat. Hist., Zoöl. Ser., 1926, Vol. XII, p. 151 (Mona).

*Oreopeleia montana*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 481 (Porto Rico, St. Thomas).—Wetmore, Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, p. 314 (bones from caves near Utuado and Morovís).

Mona, Porto Rico, Vieques, St. Croix, St. Thomas; resident.

Bowdish, the only naturalist who has found this bird on Mona Island, reports it as common there from August 9 to 21, 1901.

The ruddy quail-dove is an inhabitant of dense growths of jungle and finds cover to its liking mainly in the hills and mountains above the coastal plain. It is probable that its distribution is governed somewhat by the abundance of the mongoose near the coast, since from its terrestrial habits the dove is subject to depredation by this mammal.

Gundlach secured this dove near Mayagüez and in the interior of the island, while Bowdish found it near Aguadilla. In 1912 I observed it in dense brush about the Laguna de Manatí, north of Manatí, from July 7 to 11, this being the only point at which I noted it on the coastal plain. The growth here was so dense that it was difficult to catch sight of the birds. Above the coastal plain it was found at Maricao, from May 29 to June 5 (adult male taken May 30); Utuado, August 3 to 9 (reported); Aibonito, January 26 to February 5 (adult female taken February 2); Caguas, January 5 to 14 (adult males taken January 8, 9 and 11), and the Hacienda Catalina, March 2 to 11.

At times the ruddy quail-dove is seen in coffee plantations, where these are not kept too clean of brush, but it is usually found in areas of dense second growth on the slopes of hills. As such cover becomes restricted in area, these doves grow steadily less abundant. To observe them it is necessary to walk noiselessly along footpaths, crouching low to obtain what vision may be had of the ground beneath the dense brush. If the doves feel that they are liable to observation, they rest motionless, and at such times it is almost impossible to detect them. If approached too closely, they rise and dart into the dense growth. At other times they walk rapidly to one side, with quickly nodding heads, and it is then that they may be momentarily visible. Their flight begins with a loud fluttering of feathers, but after a few feet they set their wings and sail away on noiseless pinions. Occasionally they were seen on low limbs in the trees, perhaps six to ten feet from the ground, but this was unusual.

No nests were found, but it appeared from the actions of the birds

that breeding had begun in March. A male taken at Maricao, May 30, was in breeding condition. They are said to nest on the ground. Males during the period in question give utterance to a low, resonant note of such character that it seems always to come from a distance, though the singer may be near at hand; this resolves itself into a deep *coo-oo-oo*, with a peculiar undertone as of the humming of wind across the end of a gunbarrel—a striking sound and one whose source is difficult to locate. The birds are usually found in little groups that, however, make no pretense at flock formation.

During the orange season these doves feed mainly on the seeds of wild sweet oranges, secured from fruit that has fallen to the ground and has partly decayed, enabling the birds to peck open the skins and reach the seeds at the center. They do not touch this fruit except when on the ground, and cannot open oranges except when the skin is soft through decay, so that no injury in orange groves may be charged to them. Near Manatí they were eating the fruits of the manchineel.

Bowdish secured a male on Vieques Island, December 30, 1899, and the species was reported to me on Vieques from March 16 to April 3, 1912, but I did not see it. Cory has recorded it from St. Croix and Mr. Ridgway has listed it from St. Thomas.

The ruddy quail-dove is to be confused with no other pigeon on Porto Rico; the male is bright brown and the female olive brown, and while it has somewhat the size of the zenaida dove there are no light markings in the tail.

### ***Oreopeleia chrysia* (Bonaparte)**

Key West Quail-dove, Perdiz Martiniqueña, Barbequejo

*Geotrygon chrysia* Bonaparte, Compt. Rend., 1855, Vol. XL, p. 100. (Florida.)

*Columba martinica*, Ledru, Voy. Iles Ténériffe, Trinite, Saint Thomas, Sainte-Croix et Porto Ricco, 1810, Vol. II, p. 208 (listed).—Moritz, Wieg. Arch. Naturg., 1836, p. 389 (listed).

*Zenaida martinicana*, Taylor, Ibis, 1864, p. 171 (Porto Rico).

*Geotrygon martinica*, Gundlach, Journ. für Ornith., 1874, p. 313; Journ. für Ornith., 1878, pp. 161, 186; Anales Soc. Esp. Hist. Nat., 1878, p. 347 (Porto Rico, specimen in coll. Blanco).—Stahl, Faun. Puerto Rico, 1883, pp. 62, 148 (Porto Rico, specimen).—Cory, Cat. West Indian Birds, 1892, p. 97 (Porto Rico).

*Geotrygon chrysia*, Bowdish, Auk, 1902, p. 361 (Mona).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 49 (listed).—Schmidt, Field Mus. Nat. Hist., Zool. Ser., 1926, Vol. XII, p. 151 (Mona).

*Oreopeleia chrysia*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 472 (Porto Rico?).

Recorded from Mona and Porto Rico; of uncertain occurrence.

Mr. Bowdish reports this quail-dove as seen several times on Mona Island, August 9 to 21, 1901. Gundlach noted a specimen in the collection of Blanco, and in addition found it figured in the album of Dr. Bello. Stahl records a male in his collection.

The species is of somewhat uncertain occurrence, and unless specimens are secured, I am inclined to wonder whether the Porto Rican records cited may not apply to *Oreopeleia m. mystacea*, from which *chrysis* differs mainly in the decidedly whiter underparts and more rufous back. Like that species, it has a distinct white streak from the gape back beneath the eye.

***Oreopeleia mystacea mystacea* (Temminck)**

Bridled Quail-dove

*Columba mystacca* Temminck, Les Pigeons, 1808-1811, Vol. I, p. 124, Pl. 56. (America.)

*Geotrygon mystacea*, Cory, Auk, 1891, p. 48 (St. Croix); Cat. West Indian Birds, 1892, p. 97 (St. Croix).—Riley, Proc. Biol. Soc. Washington, February 21, 1903, Vol. XVI, p. 14 (Culebra).—Wetmore, U. S. Dept. Agric. Bull. 326, 1916, p. 49 (Culebra).

*Oreopeleia mystacea mystacea*, Ridgway, U. S. Nat. Mus. Bull. 50, 1916, Pt. 7, p. 475 (Culebra, St. Croix).

St. Croix, Culebra.

Cory reports a specimen from St. Croix, and there is in the U. S. National Museum an adult male taken February 9, 1899, on Culebra Island by Mr. A. B. Baker (U. S. Nat. Mus. No. 169,028). Nothing further is known of the bird in this region.

The species is distinguished from the ruddy quail-dove by the prominent moustachial streak and from *O. chrysis* by the darker, more rufescent brown underparts.

***Oreopeleia larva* Wetmore**

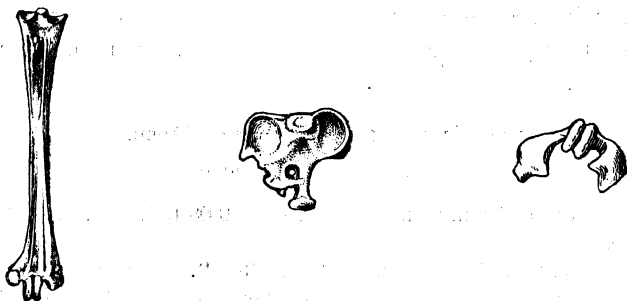
Porto Rican Quail-dove

*Oreopelia larva* Wetmore, Proc. Biol. Soc. Washington, December 30, 1920, Vol. 33, p. 79, Pl. 3, Figs. 1-2. (Cueva Clara, near Morovís, Porto Rico.) Bull. Amer. Mus. Nat. Hist., 1922, Vol. XLVI, pp. 315-317 (Morovís, Utuado); Auk, 1923, p. 324 (Mayagüez).

Porto Rico, extinct; known from bones from Cueva Clara and Cueva Cathedral near Morovís, a cave on the property of Don Gervacio Toraño near Utuado, and from a kitchen-midden deposit on Mesa hill near Mayagüez.



This quail-dove is represented by a series of leg and wing bones (Figs. 14-16) and was described with a tarso-metatarsus as type. From the slender proportion of this bone, the bird appears to have been allied to *Oreopeleia caniceps* of Cuba and *O. leucometopius* Chapman of Santo Domingo. It seems to have been a bird of moderate body frame, slightly larger than *O. montana*, but smaller than *Geotrygon versicolor*. The trochlea are slighter than in *Oreopeleia martinica* and the bird is larger



THE EXTINCT PORTO RICAN QUAIL-DOVE (*Oreopeleia larva*)

FIG. 14 (left).—Left metatarsus (type). Anterior view. Slightly less than natural size. From cavern deposits of Cueva Clara.

FIG. 15 (center).—Left metatarsus (type). Proximal view of head. Slightly more than twice natural size.

FIG. 16 (right).—Left metatarsus (type). Distal outline of trochlea. Twice natural size.

(These cuts are reproduced by courtesy of The American Museum of Natural History.)

than *O. chrysis* and *O. montana*. It is, as indicated, representative of a type known from Cuba and Santo Domingo.

The species, described originally on the basis of a very fair amount of material from cavern deposits, has been discovered more recently (in the form of a left tarso-metatarsus) among kitchen midden deposits near Mayagüez. This indicates that, though now extinct, the species has no great antiquity, since it appears contemporaneous with the aboriginal inhabitants of the island.



VIEW OF ARID SCRUB ON DESECHEO ISLAND

Taken June 14, 1912.



GROVE OF COCONUT PALMS AND BEACH, A TYPICAL SHORE SCENE

Near Aguadilla, June 11, 1912.

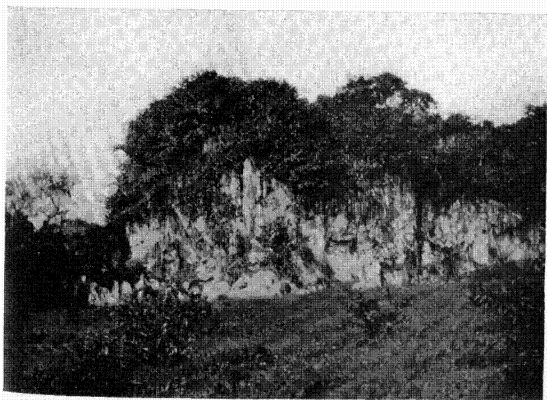






CLUMP OF ROYAL PALMS, NESTING SITES FOR PORTO RICAN AND YELLOW-SHOULDERED BLACKBIRDS

Near Yauco, May 17, 1912.



LIMESTONE FORMATION TYPICAL OF LOWER FOOTHILLS OF NORTH COAST

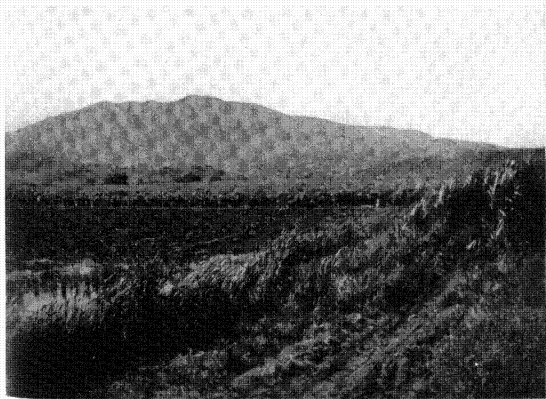
Near Trujillo Alto, December 26, 1911.







VIEW ON EL YUNQUE DE LUQUILLO FROM AN ALTITUDE OF 800 FEET  
(The highest peak is the fourth from the right.) Taken March 6, 1912.



EL YUNQUE DE LUQUILLO FROM THE VILLAGE OF MAMEYES  
Taken February 16, 1912.







ROLLING PASTURELAND, BREEDING GROUND OF THE PORTO RICAN GRASSHOPPER SPARROW  
Near Yabucoa, May 10, 1912.



SECOND GROWTH FOREST IN LOWLANDS, WITH SETTING OF CANEFIELD AND PASTURE  
On grounds of experiment station at Río Piedras, December 20, 1911.



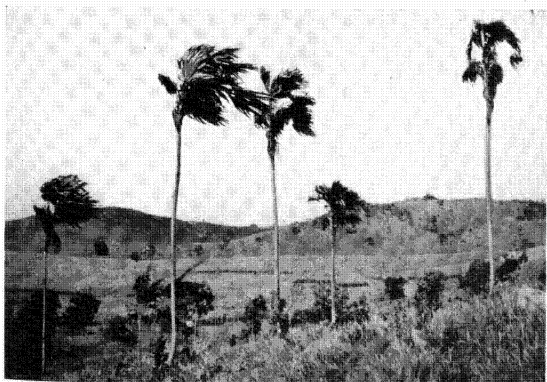






RIO SANTIAGO NEAR YABUCOA

Taken May 6, 1912.

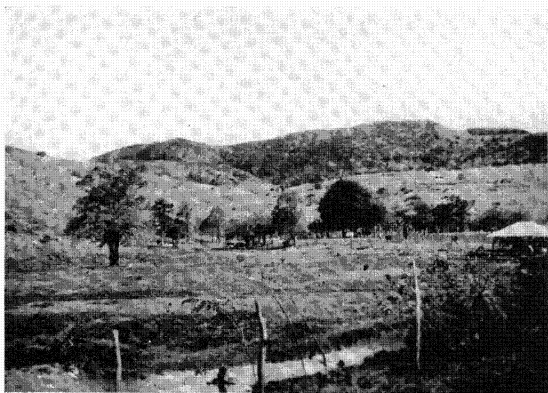


LLUME PALMS, WITH BACKGROUND OF CANE AND LOW HILLS

Vieques Island, March 20, 1912.

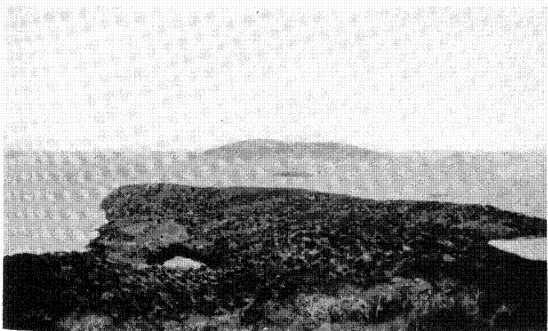






OPEN ROLLING PASTURELAND TYPICAL OF CULEBRA ISLAND

Taken April 9, 1912.



NORTHWESTERN END OF CULEBRITA ISLAND, CAYO NORTE IN DISTANCE

Taken April 15, 1912.





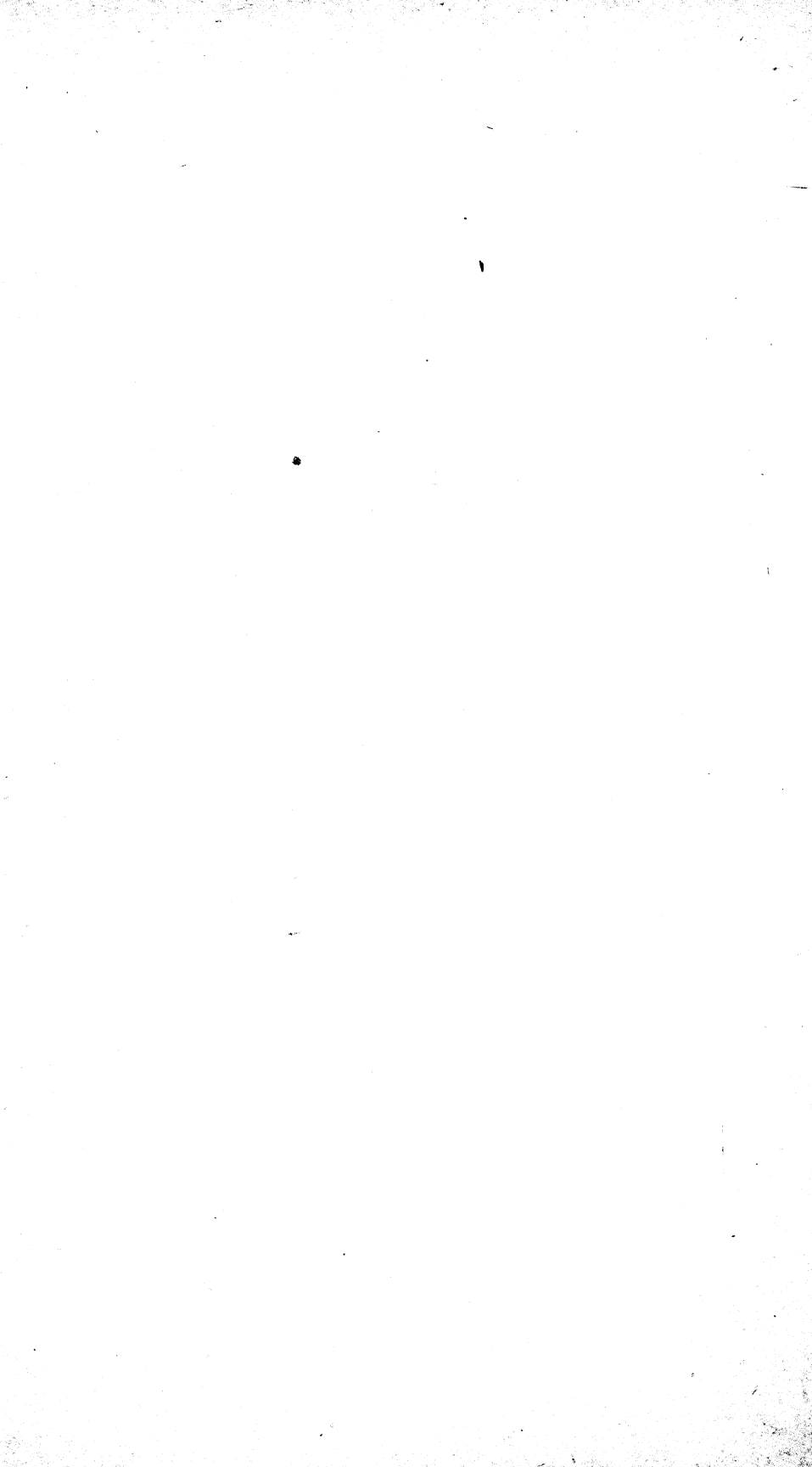


WEST INDIAN GREEN HERON, OR MARTINETE (*Butorides virescens maculatus*)

(Courtesy of Biological Survey, U. S. Dept. Agric.)









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